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ABSTRACT

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Cost-Benefit Analysis and the Adult Educator

A LITERATURE REVIEW

Sara M. Steele

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ERIC Clearinghouse on Adult Education and Adult Education Association of the U.S.A.

COST-BENEFIT ANALYSIS AND THE ADULT EDUCATOR

A Literature Review

Sara M. Steele

ERIC Clearinghouse on Adult Education
and
Adult Education Association of the U.S.A.

ERIC CLEARINGHOUSE ON ADULT EDUCATION

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Stanley M. Grabowski, Director

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TABLE OF CONTENTS

		Page
	FOREWORD	vii
I.	COST-BENEFIT ANALYSIS AND THE ADULT EDUCATOR	1
II.	COST-BENEFIT ANALYSIS CONCEPTS	1
	Program Efficiency	1
	Current Approaches for Examining Efficiency	1
	System As An Important Underlying Concept	2
	What Is Cost-Benefit Analysis?	3
	Uses of Cost-Benefit Analysis	3
	Definitions of Costs and Benefits	4
	Problems In Cost-Benefit Analysis	4
	Techniques Associated With Cost-Benefit Analysis	5
	Variations of Cost-Benefit Analysis	5
III.	COST-BENEFIT ANALYSIS OF ADULT EDUCATION	6
IV.	INPUT-OUTPUT ANALYSIS AND ADULT EDUCATION	6
	Are We Dealing With A System?	6
	When Is Input-Output Analysis Important to the Adult Educator?	7
	At What Depth, Stage and Level Should Analysis Be Done?	8
	What Are the Key Decisions?	8
V.	REFERENCES IN THE TEXT	12
VI.	BIBLIOGRAPHIES	13
	General References	13
	Adult Education — Broad Range Programs	15
	Audio Visual	16
	Farm Management Education	18
	OJT and MDA	20
	Training — General	24
VII.	NOTE ON AVAILABILITY	28

FOREWORD

In the light of the demand for greater accountability, cost-benefit analysis is one of the most vital concerns of educators, as well as others such as those in management in business and industry. There is much talk about cost-benefit analysis, but not many practicioners have the time to sift through the mounting literature on the subject to extract what is useful in their situations.

Dr. Sara Steele, on the faculty of the University of Wisconsin, has prepared a review of the literature about cost-benefit analysis which neither overwhelms the novice nor oversimplifies the procedure for the experienced.

The intent of this publication is philosophical rather than a procedural presentation; it is not so much trying to tell the reader how to do a cost-benefit analysis, but rather to help him understand what he may be doing if he elects to carry out such an evaluative procedure. It presents a brief overview of the nature of cost-benefit analysis and introduces the reader to some references which will take him further in his understanding.

The author – Dr. Steele – is an adult educator rather than a cost-benefit specialist. Her philosophical discussion in the mid-section of the paper is drawn from 17 years with Extension and intensive study of conceptual aspects of evaluation during the past four years as part of teaching a graduate level course in program evaluation at the University of Wisconsin. She views cost-benefit analysis as an activity which is both intriguing and threatening, but about which adult educators need to know considerably more if they are to make a good judgment of whether or not it is a tool that will help them in their programming.

On behalf of the many adult educators who will use this literature guide, we thank Sara Steele for the talent and many hours she has devoted to its preparation. We hope that this review, and others of a similar nature, will bring the literature of adult education a step closer to help improve research and practice in the field.

We are also grateful to the Adult Education Association of the U.S.A. for making this review more easily available.

Stanley M. Grabowski

Acting Director,
ERIC Clearinghouse on Adult Education

I. COST-BENEFIT ANALYSIS AND THE ADULT EDUCATOR

As an adult educator, are you interested in the efficiency of your program? There appears to be a widespread trend in other fields of education and related social welfare fields to consider not only the effectiveness of programs but also the efficiency of those programs. Some would say that an efficiency epidemic is in process. The germ, which was incubated in industry, swept through the government branches most influenced by businessmen, infiltrated HEW and, through federal funding of local education activities, has now become a common phenomenon in many fields of public school education.

There is relatively little evidence of how far the efficiency epidemic may be spreading into adult education. It has been extensively used in some areas like manpower training programs, but there is little evidence that it is having impact upon other areas such as liberal adult education. The Handbook of Adult Education,[1] published in 1970, has a one-sentence reference to cost effectiveness buried in a chapter on training in business and industry. Most adult education literature on program evaluation still stays with the 1952 definition that evaluation is determining the extent to which objectives have been attained.[2] That definition does not include examining the cost of attaining those objectives.

Some adult educators are probably rabid fans of cost-benefit analysis and other forms of efficiency examination. Many are rabidly opposed. Most are in the middle – trying to figure out what is involved and how much value cost-benefit analysis may have for them.

In order to determine value, one first needs to get a feel of the concepts that are involved and how they are being operationalized in adult education. The first section of this paper will present a brief overview of concepts of cost-benefit analysis; the second will review its current usage; the third will present a somewhat philosophical discussion of the potential of cost-benefit analysis for adult educators. We will go beyond "$" values and explore a very broad approach to the idea of input-output analysis.

II. COST-BENEFIT ANALYSIS CONCEPTS

Program Efficiency

Let's start with the concept of program efficiency, which is part of current pushes for the input of scientific (i.e., hard, data-supported) thinking into everyday organizational decision making. Some now define evaluation as the process of providing "information through formal means, such as criteria, measurement and statistics to serve as rational bases for making judgments in decision situations."[3]

What is programming efficiency? For our purposes program efficiency relates to how well the program utilizes the resources that are invested in it. The Glossary of Administrative Terms in Public Health defines efficiency as "the capacity of an individual, organization, facility, operation, or activity to produce results in proportion to the effort expanded."[4] Suchman indicates that "efficiency is concerned with the evaluation of alternative paths or methods in terms of cost – in money, time, personnel and public convenience."[5] There appear to be two important dimensions to a concept of efficiency: one is the idea of proportion or ratio, the other is the idea of alternative usage.

Proportion deals with the relationship of input to output within a given program without regard to alternatives. For example, it raises such questions as: Were the accomplishments sufficient for the amount of resources expended? Were resources fully utilized in the course of the program or was there waste and slippage? Was the value of the result great enough to merit the cost of attaining that result?

The dimension of alternative usage, however, compares one proportion of input to output with other proportions which might be attained. It deals with such questions as: Is there any better way to attain the same results? Can the same end result be achieved in different ways at less cost? Of these two proposals, which will produce most at the least cost to the agency? Would there have been a greater value to the participants, to the agency, or to society, if the same resources had been invested in a different program?

Current Approaches for Examining Efficiency

Along with the push for analyzing the efficiency of educational operations has come the concept of system and of system analysis. A variety of

management activities have a system base and focus on efficiency of operation. Three of the most common are PERT, PPBS, and cost-benefit analysis. Although this paper is focusing primarily on cost-benefit analysis which deals with how efficiently resources are used in producing a product, it is important also to see the relationship of cost-benefit to the other two procedures.

Cost-benefit analysis is usually a sub-part of PPBS, (Program Planning Budgeting System), which deals with the overall budget operation. This system compares the efficiency of one program proposal with another by means of cost-benefit analysis. PPBS differs from other forms of budgeting in that it examines both resource input and the potential results from those inputs. Former budgeting approaches focused almost entirely on resource inputs. PPBS requires the agency to establish clear statements of expected outcomes in quantifiable or measurable terms and examine alternative costs and benefits in carrying out the mission of the agency.[6]

Cost-Benefit analysis and PERT (Program Evaluation and Review Technique) often are teamed in examining the efficiency of an on-going program. While cost-benefit focuses on the relationship of investment to results, PERT examines the efficiency of the process by which the results are attained.

Ryden calls the procedure one of establishing a network of the events and activities involved in developing the program. The network is a graphic representation of the project plan. Time estimates and deadlines are established for each item in the network. Actual operations can then be examined against the proposed network to see whether progress is proceeding as expected, and whether resources are being adequately used in those processes.[7]

System As An Important Underlying Concept

We make better use of tools when we understand their relationship to the phenomena to which they are being applied and the circumstances which brought a given tool into being. It is tempting to borrow cost-benefit analysis as a tool and adapt it to our needs in adult education, considering only cost-benefit per se. Our understanding will be greater, however, if we take time to consider that cost-benefit analysis is a system tool.[8] It is based on the central premise that the activity to which it is being applied is a system, or an assemblage of parts united by some form or regular interaction or interdependence. Components include both the inputs in terms of men, money, and materials to do the tasks of the system, and the nature of the task itself. Those phenomena which make up the completed task are the outputs of the system. In addition to inputs and outputs, however, one must also be concerned with the boundaries of the system, the component parts that make up the system as a whole, and how those parts are organized.

And one must be concerned with the relationships of various systems – with the idea of sub-systems and of super-systems. Most systems are responding to the needs of some larger system, and the outputs need to be things wanted and needed by a super-system. An educational institution, for example, is a system, but the nature of its outputs are affected by what some other system – businesses or industries, the community, or a segment of society – wants. Within the educational institution there may be a variety of sub-systems at work, such as teams of teachers, and back-up personnel like audio-visual specialists.

In understanding the systemic nature of his operation, the educator does well to look at two concepts of system. The concept that has been outlined above looks at system primarily through the eyes of the engineer or other professional dealing with system in terms of physical or operational phenomena. The second relevant concept of system is that of the social system. Each part of a system, sub-system, or super-system which has people involved and where these people share something in common and interact in some fairly regular way, comes to have a social identity with its own people-interaction parts. The nature of the social system has been described in various ways by sociologists like Loomis,[9] and the relationship of such systems to education by Forest.[10] Social systems become important in examining program efficiency in that the various social systems involved directly affect the efficiency of the physical or operational system that is being used.

This adds up to complexity and to gigantic problems. The systems approach was developed as a means of dealing with complexity and complicated problems. As production tasks became more complex and as problems became more and more complicated, it has become important to analyze the complex phenomena and identify its component parts and the relationships between the parts as a means of defining a problem and identifying ways of dealing with that problem. The systems approach also is important in keeping complex operations going efficiently by preventing problems.

Cost-benefit analysis is sometimes extracted and applied without regard to the position of inputs

and outputs and process to the system. However, it is well to keep the concept of system and its importance in mind as we move on to a more detailed description of cost-benefit analysis.

What Is Cost-Benefit Analysis?

Cost-benefit analysis is a procedure by which the cost of producing a product is compared with the value of the product that is produced. In its most common form, both the cost and the benefit are described in monetary terms.

The following descriptions of cost-benefit analysis identify the basic ingredients and related ideas.

> By "cost-benefit" is meant the relationship of the resources required (cost) to attain certain goals (benefit). It is based on the economic concept that many executive decisions involve the allocation (best use) of limited resources among competing requirements. The allocation of available resources is determined by a comparative analysis of the current system with presumably practicable alternative systems.[11]
>
> * * *
>
> "...any analytic study designed to assist a decision-maker in identifying a preferred choice among possible alternatives ... usually it consists of an attempt to minimize dollar cost subject to some mission requirement (which may not be measurable in dollar terms) or, conversely, to maximize some physical measure of output subject to a budget constraint."[12]
>
> * * *
>
> "Cost-Benefit, or Cost-Effectiveness, Analysis is the quantitative examination of alternative prospective systems as to the potential trade-offs with regard to the benefits, or effectiveness, to be gained and the costs to be incurred among the alternatives for the purpose of identifying the preferred system and its associated equipment, product, etc. Dollars are the units most generally used, but any economic resource might, for a given problem, be the limiting factor – e.g., personnel."[13]

The three descriptions vary in terms of the complexity of the idea they present. However, it is apparent that there is an emphasis on (1) the relationship of the technique of cost-benefit analysis to decision making, (2) the technique as being an analytical process, and (3) going beyond the simple ratio of resources to results and making a comparison of alternative ratios.

Quade suggests that there are five elements of analysis, each of which is present in every analysis of choice, although they may not always be explicitly identified: (1) the objective (or objectives), (2) the alternatives, (3) the costs, (4) a model (or models), (5) a criterion. The criterion is the rule or standard by which the alternatives may be ranked in order of desirability and the most promising may be chosen. It provides a means for weighting costs against effectiveness.[14]

A cost-benefit analysis usually consists of five steps:

1. Identifying the pertinent measures of effectiveness, i.e., benefits.
2. Describing the alternatives.
3. Expressing both mission performance and cost as functions of the characteristics of each alternative.
4. Estimating appropriate values for the equation parameters.
5. Computing, analyzing, and presenting results.[15]

Uses of Cost-Benefit Analysis

One part of understanding a concept is understanding how it can be used.

Hatry suggests the following uses of cost-benefit analysis:

(1) To aid decision makers, in situations where funds or other economic resources are a significant constraint, in making improved choices among alternative systems.

(3) To provide indications as to specific areas for further study or research in which funds might be applied to bring overall system savings or to reduce critical areas of uncertainty.

(4) To suggest, in certain situations, additional alternatives that would fare well in the face of the major difficulties of the examined alternatives and that, therefore, might be preferable.

(5) To indicate, for industrial users, the magnitude of the potential business for major components of the preferred system – at least, for specified effectiveness levels.[16]

Carpenter and Haggart of the RAND Corporation, a company which has been closely identified with the concept of cost-effectiveness analysis, have indicated the following uses for cost-effectiveness analysis in educational settings:

--to help assess the relative worth of several innovative programs with the same educational outcome.

--to determine whether a single program is becoming more or less effective as time passes so that steps may be taken to improve it, if necessary.

--to help assess the relative worth of the same program for different student populations.[17]

Like any tool, one must be clear in terms of what the cost-benefit analysis can and can't do.

Carpenter and Haggart point out that:

"The goal of the analysis is not to provide the planner with the alternative that 'maximizes' or 'minimizes' specific characteristics; the goal is to provide information which together with the judgment of the planner permits a compromise among the characteristics of the alternate few within the various environmental constraints, such as budget lebel or political atmosphere."[18]

Levine cautions:

"It is not a substitute for the educated judgment of the decision maker. Rather, it provides a package of relevant information on which to base certain kinds of decisions. Also, it does not favor the 'cheapest' or even the 'best' program but the optimum program in terms of the available resources (money, trained personnel, facilities)."[19]

Definitions of Costs and Benefits

As various components are identified and clarified in field operations, the jargon increases. For example, experiences in evaluating programs in the war on poverty indicate that costs may be of two types: direct costs and opportunity costs.

Opportunity costs consist of the other benefits foregone; for example, what, if anything, would an on-the-job-training participant be earning if he had been employed elsewhere and not participating in this program?[20]

Benefits also have been defined as being of two types: private and social. Private benefits are those accruing to the individuals involved. Social returns are returns which accrue to the entire society and not to any one individual.

One important component of a concept of benefits is that of the attainment of objectives. Each person who is management-by-objectives (or education-by-objectives) oriented will have to reconcile the degree to which the attainment of objectives is synonymous with the benefits of the program. In many instances benefits are defined as those changes which are defined in the program's objectives. Levine suggests that the objectives, goals, values, etc., determine the agreed upon kind and degree of change. The objectives constitute the criteria which determine whether a "benefit" is in fact so.[21] However, if one adapts Scriven's framework of effects of education to benefits of education,[22] it might be suggested that, in addition to the benefits directly defined in the objectives of the program, additional beneficial effects to others than those directly involved in the program might also well be considered in an analysis of benefits.

In some instances negative effects may also need to be calculated and subtracted from benefits before the cost-benefit ratio is figured.

Problems In Cost-Benefit Analysis

Cost-benefits analysis of education and social action programs is relatively new. There is much yet to be thought through and developed in order for the tool to reach its fullest value in these settings.

Even some of the strongest proponents of cost-benefit analysis agree that it is not easily or automatically carried out. Like many other evaluative activities, much of the process is dependent upon human judgment.

Carpenter and Haggart point to some of the following problems in using cost-benefit analysis in educational situations: difficulty in determining the resources required in a program, the misleading nature of a single measure, the lack of a fully developed methodology for cost analysis, difficulty in measuring effectiveness, the inaadequacy of a single measure, the lack of methodology for estimating the effectiveness of future programs, the need for criteria for effectiveness.[23]

Cain and Hollister give an extensive discussion of problems in the design of evaluating social action programs using a cost-benefit approach.[24] They discuss problems in specifying objectives, using control groups, the replicability criterion, statistical considerations, economic considera-

tions, including the discount rate and organizational problems, such as timing and ability to hold design and internal data systems.

It is apparent that, at its present stage of development, cost-benefit analysis is like any other techniques of analysis. Operationalization of it is based upon certain decisions and assumptions. As in other situations, these decisions and assumptions often are open to question. The individual doing the analysis needs to be able to support his decisions and assumptions. The extent of his ability to do so will, in part, affect the trust that others will place in his analysis.

Techniques Associated With Cost-Benefit Analysis

Some of the problems inherent in operationalizing cost effectiveness have led to the use or development of some special techniques. Techniques particularly helpful in cost analysis or estimation, which appears to be developing into a specialized field of its own, include: (1) Linear Programming Techniques, such as statistical regression analysis for estimating costs of proposed items which are generally similar but somewhat different from those on which direct cost experience is available. A distinctive feature of the resulting estimating equations is that they relate selected physical or performance characteristics of the item to cost. (2) Progress Curve Analysis — for use in estimating future hardware costs in those instances where varying the quantitative requirements appears to produce a significantly different unit cost. (3) Engineering Analysis, to provide the basic information for describing the cost-generating characteristics of new or future components.[25]

One of the major problems in cost-benefit analysis is the inherent uncertainty of the data. In order to make data more useful, various techniques have been evolved for testing the degree of uncertainty or for identifying range under given conditions. In sensitivity analysis the costs for the most extreme variables are plotted and the most critical variables identified. Usually, costs are plotted according to the high cost and low cost conditions.

A second companion technique is that of subjective confidence limits. In this approach the range of values for each parameter is assumed to conform to a particular probability distribution and thus to indicate the likelihood of the various situations occurring.[26]

Variations of Cost-Benefit Analysis

As a tool is used in new settings, new adaptations of it emerge. Tanner uses the term utility-cost sensitivity analysis in a somewhat different way. He makes cost-benefit analysis more useful in situations where it is hard to affix dollar values by suggesting that value judgments based on something (need, value, output, etc.) have usually already been made about school activities and that what needs to be done is to translate them into a common numerical scale of utility factors which will show comparative values of the various activities.

In this procedure all of the activities to be compared are assigned a utility factor which shows their rank in terms of order of importance and preferences. These utility factors become the numerators for their respective activity costs and the cost-utility ratio is then calculated. These ratios provide an index to aid decision makers in allocation of resources. The crucial step in this process is assigning some type of numerical value of benefit which is not so much a value of the benefits to the activity itself as it is a symbol of how those benefits rank in comparison with other activities which are being examined.[27]

Carpenter and Haggart suggest that there may be value in educators constructing equal-cost alternatives as a part of cost-benefit analysis. In such an approach, the costs of all programs would be held at the same point through adjusting the dimensions of the program, such as the number of students enrolled. With cost held constant, the comparison becomes focused on differences in effectiveness. As an alternative, equal-effectiveness alternatives might be constructed where the output is held constant and suggested programs are examined in terms of variation in input. The latter requires that it be possible to calculate output accurately.[28]

Another approach has been developed by a public health team. They suggest that there are three basic components of programs: Objectives (O), Activities (A), and Resources (R). To determine program efficiency, they suggest that the attainment of the program objective which is attributable to the activity (AO) should be compared with the desired level the planners had expected to result from the program (PO). The ratio AO:PO describes the effectiveness of the program. They define efficiency as the ratio between the net attainment of objectives (AO), output, and the program resources expended (AR), input (AO:AR). The reverse ratio AR:AO yields a measure of average cost. They suggest that efficiency studies may answer several relationship questions:

1) relationship of objectives attained to resources expended, AO:AR or AR:AO;

2) activities performed to resources expended, AA:AR or AR:AA;

3) objectives attained to activities performed, AO:AA or AA:AO.

To some extent the EMIS system (Extension Management Information System), which has been adopted by the entire Cooperative Extension Service, is attempting to examine some of these relationships. Time is the major resource examined both in terms of activities performed and objectives attained. The system has an added dimension of examining the time one has planned as compared with the time that was actually spent on the various objectives.

III. COST-BENEFIT ANALYSIS OF ADULT EDUCATION

Some cost-benefit analysis of adult education programs is being attempted. However, if the reports in the ERIC collection are any indication, it would appear that the use of cost-benefit techniques has been limited primarily to 1) programs which lend themselves to achieving economic outputs, and 2) programs which are closely associated with industry.

Over half of the 70 items indexed as cost-benefit analyses in the ERIC collection on January 1, 1971, dealt with studies of training programs. Many were reports of On-The-Job Training programs or others carried out under the Manpower Development Act. Some examined other types of industrial training programs. About ten percent dealt with the cost-benefits of farm management education programs, another ten percent dealt with studies of cost-effectiveness of audio-visual programs or other programs using educational technology. Three studies dealt with cost-benefit analysis of general adult education programs (Utah, Quebec, and Massachusetts), one with adult basic education, one with Title I, and one with teacher decision-making. About a tenth of the references were general references to the concept of cost-benefit and its use in educational planning.

The adult educator proposing to do cost-benefit analysis will do well to study the techniques used in some of these studies and to consult with those who did the analysis and who gained a greater understanding of the procedure, potentials, and difficulties through first-hand experiences.

IV. INPUT-OUTPUT ANALYSIS AND ADULT EDUCATION

Cost-benefit analysis is beginning to be used in adult education. It is a system's tool which has had considerable value in other settings. What is its potential value to the adult educator?

Although a "$" value analysis may be of use to some programs at some points in time, a greater value may lie in broadening the concept to one of input-output analysis and considering some of the philosophical questions that may be involved in such analysis.

This final section of the paper will consider the following questions: (1) Are we dealing with a system? (2) When is input-output analysis important to the adult educator? (3) At what depth, stage, and level should such analysis be done? (4) What are the key decisions in operationalizing input-output analysis in adult education?

Are We Dealing With a System?

Fundamental to the concept of input-output analysis is the basic concept of system. Is adult education (the educational program you are examining) a system? Should you view it as a system when you attempt to understand what you are doing?

A few years ago there may have been an occasional argument as to whether adult education was an art or a science. Now it seems that the question might be — Is it an art, a science, or a system?

It is possible that adult education is all three. Our difficulties may arise from not recognizing and utilizing the qualities of all three that are present. Adult education, or a given programming operation, is a system in that there are clearly identifiable parts united by some form, regular interaction, or interdependence. We know enough about the process and some of the components to be able to deal with them as with a science. And yet with the range of complexity involved with human variance, there is still a great deal of art involved in adult education.

In other words, it may be extremely helpful for us to view our operations as we would a production system and to clearly analyze the parts

and their relationships. But at the same time we must be constantly aware that in the complex human interactions which are involved in education, regardless of our care in planning and in acting, we cannot be sure that Z will automatically follow if we apply X to Y in a certain way. The surety which is usually operating in manufacturing systems or other activities dealing primarily with non-human elements just isn't there in adult education, unless we resort to techniques resembling brainwashing.

Frustrating as the complexity of the situation is, one might argue that the potential for variance is a good thing – that adults need to be free to interact with the educational stimuli in their own way, based upon their individual needs and individual experiences. Certain inputs may result in certain results in terms of certain students, but to demand that those inputs result in the same results for all students may not often be appropriate.

Yet it can still be valuable to analyze our work as though it were a production system if we don't act as though it is a mechanical, semi-automatic process.

When Is Input-Ouput Analysis Important to the Adult Educator?

In addition to looking at adult education as a system, it may also be helpful to do input-output analysis. Each of us has to decide why we want to do such an analysis and when it is most appropriate.

Some educators may <u>have</u> to do input-output analysis (in this case cost-benefit analysis); in some instances they may <u>need</u> to do such studies; in other instances they may want to make sure of a particular technique as part of their process of decision making or as a means of gaining a better understanding of the process of adult education.

The <u>have</u> to pressures may come from at least two sources – programs directly supported by the federal government, and situations where military or industrial experts (or other power figures committed to the concept of cost-benefit analysis) are on local boards or in administrative positions and are able to exert strong pressures for this kind of analysis. In these instances, the adult educator may have to be prepared to carry out, or have a fairly formalized process of cost-benefit analysis applied to his program.

Adult education may as a whole be more exempt than other branches of education from the compulsion to apply such techniques, because many parts of adult education are so structured that at least partial control rests directly in the hands of local citizens and there is direct visible accountability to those who are providing the money to support the program. Pressures for cost-benefit analysis are very apt to come from more remote funding sources. The self-supporting program which is not relying on tax monies or other monies, and remote either geographically or in interest from the program, may be less apt to feel pressure for using this particular technique, because judgments in terms of input-output ratio (in the sense of whether the value received exceeds the cost) are being made daily by those enrolling in and continuing with adult education programs.

<u>Need to</u> – Input-output analysis does not become important to many adult educators until a given resource is scarce and there is a good deal of need for it, or a good deal of competition to secure it. At that point, the adult educator may be willing to expend extra effort in order to utilize the amount of the resource that he is able to muster in the most efficient way possible.

There may be some adult educators – those who have unlimited resources, or few pressures on those resources, and who have similarly blest clientele — who can luxuriate in being inefficient. However, if any shortage is involved, then efficiency rears its head (ugly or enticing depending upon how it is handled).

<u>Want to</u> – Some adult educators may want to make input-output analysis an important tool of programming.

If an adult educator is strongly influenced by the Protestant ethic, a good frugal up-bringing, a strong business motive or any of the related value syndromes, efficiency may be important for its own sake. If so, the adult educator will be concerned with proportion and best use of resources even though the resources are sufficiently abundant to meet present and projected future needs. He will be efficiency-orientated because efficiency is an important element in his value system.

Another type of adult educator who may at least want to test out input-output analysis is the individual who has an "itch to know" more about the adult education process. Examining output under varying input situations can tell us a good deal more about how to optimize learning for different types of clientele in different situations.

For these two types of adult educators and for the individual who uses input-output analysis as a tool in handling a scarce resource, input-

output analysis can become a viable tool rather than a threat.

At What Depth, Stage and Level Should Analysis Be Done?

The kind of input-output analysis which is most often found in the literature involves a fairly complex process, utilizing sophisticated research techniques, which is applied at the end of some major program. As a result we are apt to have a fairly rigid concept of input-output evaluation. As a tool, however, input-output analysis can be extremely flexible if we are creative enough to make it so. It can vary in depth, be applied at different programming stages, and be applied at each level of programming.

Depth – Various continuums have been built exploring the degree of depth of evaluation. Usually the continuum has at one end the type of evaluation that takes place in everyday thought processes and at the other some description of a highly formalized process which draws heavily on research procedures. There may be as much value in applying input-output analysis at the everyday end of the continuum as there is in applying it in the formalized study sense. As we choose between alternatives in everyday activities in adult education, it may be helpful to consider both what we may need to invest in each alternative and what we might expect as results from it. Although we may be more accurate in our conclusions if we can marshal accurate data to help us make comparisons, we may sometimes have to use the data which can readily marshal and discount it on the basis of apparent limitations rather than carefully designing a study-type approach with substantial fresh data collection. Sometimes we just can't wait for the formalized study. We have to draw upon past experience and what little we know about the new situation. One way of improving use of data at the point in need may be that of developing information systems which will have the relevant data needed for an input-output analysis readily at hand at the point in time when we need to make a decision. Too often, evaluation is thought of as a point-in-time evaluative study designed to secure data rather than an ongoing process utilizing data which is produced by a carefully designed continuous data system. The system analysis approach tends toward the type of design which continually provides high quality data for the types of decisions that need to be made when that decision arises.

Stage in Programming – Evaluative activities, including cost-benefit analysis, have traditionally been associated with the conclusion of a program. However, PPBS calls for cost-benefit analysis to be applied to a program before the program is approved for the coming year. Decisions between programs are based upon prediction as well as past performance. Input-output analysis can be as important a tool in designing a program – choosing between alternative approaches to be used – as it is in summative evaluation. The concept of proportion between resources and expected results and alternative usage are important at each stage in the programming process.

Level of Programming – Cost-benefit analysis has tended to be introduced as a tool of top administration. However, the concept of input-output analysis and its related activities may be as important at the very micro level (individual teacher-participant interactions) as it is at the very macro level (the top executive making national budget decisions which may affect literally hundreds of individual programs.) An action in the most micro sphere has an input and an output and a proportion of return. In most instances, there are alternative ways that the output could have been secured or alternative uses to which the input could have been put. This is a part of the operational decision making that is the life blood of programming and guiding learning. The dimensions of both proportion and alternatives also pervade all other levels of programming, although at higher levels more attention may be paid to the alternative proportions than to the proportion of any one program.

What Are the Key Decisions?

The basic decisions which will give the programmer the most difficulty as he attempts to operationalize a concept of input-output analysis in terms of his program are not those dealing with how to quantify or how to measure and analyze; there are ways of surmounting problems in these areas. The basic decisions which must be grappled with and where the programmer will find few easy and clear answers include: (1) which resources? (2) whose resources? (3) output for whom? (4) what outputs? (5) what is value?

In each instance, he will have to deal with the philosophical as well as the practical issues involved. If he is willing to buck what little tradition there is and be creative, he has considerable choice open to him in regard to each of these points of decision and can choose what is most relevant to the needs of the situation. However, in each case he will be vulnerable to opposition and must have his rationale firmly in mind. As he makes his choices and continues on his way exploring the relationship of input to output, he not only must be independent and innovative, but he also must continue to check the reliability and

validity of his decisions so that he doesn't end up expending considerable resources on a house-of-cards that can be leveled by a few concise sentences from a clearheaded opponent. But the decisions rest with him. As with any other evaluative tool, input-output analysis is a tool for improving and facilitating human judgment, but cannot ever replace it. Its quality rests primarily on the human judgment that controls it. That judgment is a part of the professional qualifications of the really top-notch adult educator.

Which Resources – Although we automatically think of the money involved, other types of input may also need to be scrutinized.

In periods of a tight economy, both the participant and the adult education agency may be concerned about money. The potential program participants may have heavy demands competing for the money which they would like to use for more education. The agency can't produce nearly as many programs as it would like, so it has to concentrate on those expected to have maximum value. Even "society" as a whole becomes involved when there is heavy pressure on the tax dollar or other dollars earmarked for social betterment and those dollars could be spent in many ways in improving the welfare of the population.

Regardless of whether money is scarce, another resource that must be taken into consideration is time – both the time of the programmer and the time of the participant. Both can invest their time in a variety of ways. Which way will give them better payoff for the amount of time invested?

Still another resource which is not usually found in lists of resources, but which is a key one in the programming situation, is that of human energy. This resource includes not only physical energy but also mental energy used in creativity and deep thought. Successful educational activities require energy input from both the programmer and from the participants. To borrow the McClusky power/load concept,[30] this energy at times becomes a limited resource and may need to be used efficiently. There are other resources, of course – personnel, supplies and materials, facilities – which may be scarce and, therefore, require efficient utilization and which at times need to be the focus of input-output analysis.

Whose Resource Inputs? The last section suggested the importance of analyzing an adult education program from the standpoint of the participant as well as from the standpoint of the agency. There may be at least four owners of resources that need to be considered in input-output analysis – the adult educator, his agency, the participant, and the broader society.

The adult educator is concerned about those of his own resources which he invests – his time, his energy, his creativity, the intensity of his attention, etc. Unless he is functioning on his own, he also must be aware of the use of the agency resources – total manhours, materials, facilities, supplies, etc. The agency and the individual resources are apt to rank uppermost in terms of many adult educators' contemplation of efficiency.

But adult education has an important element that is different from most other "production" situations. Its consumers are volunteers. Therefore, the way they view the use of their own resources will become an important factor in terms of how much they will participate. Does a given program appear to require too much from them (money, time, energy, etc.) for what they expect to get out of it? Or, more importantly, do they see a strong enough value resulting from their participation? Does a given activity within a program require so much that the individual will mentally or physically drop out? It is possible for a program to utilize the programmer's resources and those of the agency relatively efficiently but to be extremely wasteful in the use of the participants' time or energy. Most adult educators have come to recognize that many of their clients do have certain limits to the resources they can invest and to take these limits into account as they develop programs. For example, "A $10 fee may be too high for the expected clientele;" "Students in a night class have been on their feet for 12 hours and may have low energy levels;" or "Farm homemakers have to be back home by chore time." However, adult educators may have given less attention, as they attempt to figure efficiency ratios on programs, to calculating the ratio from the participant's point of view – how much did he have to put into the program (time, energy, etc.) as compared with how much he feels that he got from the program.

The fourth owner of resources, sometimes forgotten by the adult educator, is "society." In one respect the time, money, and energy of all the individuals involved is part of a "societal pool." One use of the resources in that pool may mean that those resources are not available for other uses. For example, when the modern middle-aged matron is engrossed in formal continuing education courses, she is not spending that same time on social causes and volunteer work. Society may be losing something when she expends

her energy elsewhere. Granted, it may be gaining something else through her better understanding of contemporary situations. But which has the most value at a given time and in the long run?

Output for Whom? – Just as four separate but related entities make input investments into each adult education program, so the same four – the adult educator, the agency, the individual, and society – may all be concerned with the output.

Basically we might say the most important output is that which the participant receives and the value of such output to society which reflects back on the image of the programmer and the agency. But at times, all four may have separate desires in terms of output. For example, the output wanted by the participants and the output needed by society may not always be the same. In the case of programs dealing with ethnic relations, the white conservative may want something that will help him ease his conscience, while society wants decisive positive action from him. Participants may take part in other programs to increase their own self-concept and confidence with no intent of using what they gain from a program. Society may want greater production from them.

Realistically, survival and image enhancement are important objectives of the agency and of the programmer although we seldom are honest enough to put those particular cards face up on the table. Sometimes the agency and the programmer will invest inputs for the primary purpose of maintenance rather than the desired outputs of some segments of society, or some segment of the clientele. Or, in somewhat different terms, the agency is usually interested in outputs which enhance its reputation in the eyes of those who have power over the particular agency.

In addition, the creative, energetic programmer is concerned with output which gives him satisfaction. According to his own values and interests, he may find some results of programs much more satisfying than some others.

Just as there are several sources of input which, in relation to a given decision, may be important for analysis by the adult educator, so also there may be benefits to several sources. In some analyses, it is important to look at the output to a given source in comparison with the input invested by that source. For example, what does the participant gain for what he invests? What does the programmer get from what he invests of himself and his skill? What does the agency secure in terms of image and security from its investment in a program? What does society get in terms of the betterment of its conditions by its two-fold investment – through the agency costs of the program and through the costs in participant time and money?

In other instances, it may be important to look at the benefits to one of the investors which come from the investment of one of the others. For example, how does society benefit from the investments of the participants? How does the participant benefit from the investments made by the agency? Although a given input-output analysis may concern itself with only one set of resources and one set of results, occasionally a programmer may want to think through the mesh of interrelationships between the inputs from the four sources and the outputs to those sources.

What Outputs? – What are the outputs that each of the four expect? How can they be categorized?

Some adult educators would say that the answer to the question, "What output should be expected from a program?" is simple. "Of course, it's the extent to which the program meets its objectives." Others would say that in adult education the outputs are changes in knowledge, skill, and attitude. Some would view this kind of output in almost the same way that they would view the output of formal school youth education, except, of course, that the clientele are adults and, as such, certain differences in approach must be utilized. Some would be very specific in labeling the precise behaviors expected from a given program.

But is the identification of output quite that simple? Should one be concerned only with the extent to which certain learning objectives are attained? Some literature on evaluation points out that programs may produce both direct effects and side effects and that the effects may be short- and long-range. Programs may produce both positive and negative results, often yielding a blend of the two.

Houle's explorations of reasons for learning would tell us that not all who participate are seeking specific knowledge, skill, or attitudes.[31] If this is the case, then we might hypothesize that the socially-oriented participant may desire quite different output from his participation than does the task-oriented participant.

In some instances, there may be much more concern with broad development, either on the part of the individual, or through him on the part of a community or segment of society, which can be stimulated, directed, influenced, or speeded up

through participation in adult education programs. This may be a more important output than the output related to the specific learning objectives of a given program. In agricultural development programs, for example, Hayes suggests that changing farmers' attitudes about using new practices and continuing to learn new methods may be a more valuable result than farmers simply adopting one new practice in a given program.[32]

There may be a wide range of outputs that one or more of the four types of participants might desire. Some include:

1. economic improvement – outputs which show marked gain in the economic status of the participants, the community, or the economy of a region or country.

2. action – outputs which result in direct action on the part of the participants.

3. specific knowledge, attitude or skill – in some instances knowing may be enough.

4. development – "better" people, groups, or communities because of participating in adult education programs. "Better" may be defined in several ways – more open to ideas, more productive, more skillful in everyday relationships, better communicators, more affluent, more attractive, more comfortable.

5. enhanced self-concept – a feeling of "worth" and ability to proceed with confidence.

6. satisfaction and enjoyment – the pleasure of learning and/or interacting with others.

7. prestige – the actual being among those present may yield a value above and beyond what actually happens while one is present.

The educator is faced with some philosophical dilemmas as he recognizes some of the different kinds of outputs that the various investors may be expecting. He soon realizes that the results of his programs may not be quite so easy to define as he once thought they were. Of course, he may choose to confine himself to education only in the sense of helping his participants add to their knowledge, gain skill, or clarify their attitudes and develop some affective orientations, but is that all the program will be judged by? Is it all it should be judged by?

The alert educator considers what outcomes each of the parties involved may see as most important – the participants, the agency, society, and the educator himself. Then he has to decide what he is going to do with conflicting expectations. His response moves from the realm of philosophy to a recognition of any political connotations that may be involved.

Both the philosophical and the political connotations must be considered too, when one is doing an input-output analysis of a program. If society is interested in the analysis, it (or the leaders that represent it) may not be satisfied with the analysis unless the benefits are defined in the way they desire. The militant black, for example, may want benefits defined in terms of increased self-concept on the part of the black and reduced racism on the part of the white, and may not be satisfied with an analysis done on the basis of benefits in terms of acquiring facts. If the power figures representing society have the power to support or to wash out the program, then it becomes important that the analysis be made on their terms.

The Value Question – As with other forms of evaluation, input-output evaluation may ultimately lead the adult educator to face the concept of value. What is valuable to whom? What is most valuable? How valuable are the results in comparison with the value of the investment? WHAT IS VALUE? HOW DO YOU DEFINE OR DESCRIBE IT?

Our typical approaches to evaluation and training in research give us little preparation for dealing with basic value questions. And yet they, in the long run, are the heart of evaluation. The basic questions, not only in efficiency evaluation but in all decision making in programming, ultimately deal with comparative value of the alternatives. Over the years we have approached such problems by saying that we need more scientifically pure data. Scientifically pure data, however, has little utility unless it is applied in situations where someone is able to assign or relate it to value components. The adult educator cannot escape valuing by burrowing into data; as a professional he must be able to define and assign value and use data, statistics, and the tools of sophisticated research to help him in this task, but bare numbers seldom provide the most important answers.

If any firm answers are to be found as to the nature of value, they are as apt to come from the philosophers as from the economists. Or, probably, the adult educator needs to draw from a wide range of disciplines as well as from his own common sense and experience as he tries to define the value components involved in his program.

In Conclusion – It would appear that, beyond coping with cost-benefit analysis in a monetary sense when it is required, the concept of input-output analysis may have other values in improving adult education programs. Perhaps these values lie not so much in "answers" which the tool can help to provide as in the philosophical questions related to resources, their use, and value of output that the programmer may have to deal with as he develops the framework for his analysis.

Here, cost-benefit is like other evaluative activities in that the real value may lie not half so much in the "hard data" that such an analysis may produce as in the nature of the thinking that is triggered and the better understanding of that complex phenomenon – modern adult education.

Little time has been devoted in this paper to the processes involved in carrying out input-output analysis procedures. We know much more about the processes of producing data than we do about the processes of using data. There is a danger that the average fledgling researcher (and most adult education Ph.D.'s are fledgling researchers) will become so enamored with data production that he fails to deal with the philosophical issues that are involved. Data and the processes which produce it are tools rather than ends.

Hard data (scientifically processed information) is seldom hard enough to stand unchallenged and be accepted as conclusive proof in controversial situations. However, for years we have deluded ourselves into a will-o'-the-wisp search for such proof. With our engrossment in sophisticated research techniques, we have minimized the other half of the equation. Data has no value unless it is used. The challenge of input-output analysis and other forms of evaluation is not merely obtaining scientifically pure (reliable, objective, valid) data, but also using that data in a way that has value. It is only then that the benefits of evaluation will equal the costs involved. There lies the untapped powerhouse.

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Since refinements in cost effectiveness analysis in the past few years have made it highly acceptable as an aid in decision making at high policy levels, a detailed discussion of some aspects and implications of cost effectiveness analysis are included in this book. The first five chapters give an overview; measures of effectiveness, choice of analytic techniques, use of cost estimates, and estimating systems costs. Chapters Six, Seven, and Eight give examples of military uses for cost effectiveness analysis, while chapters Nine, Ten, and Eleven show applications for government domestic programs, the War on Poverty, and metropolitan transportation systems. The last two chapters cover structures of incentive contracts and of military industrial funds. Extensive tables and references are included.

THE METHODOLOGY OF EVALUATING SOCIAL ACTION PROGRAMS. Cain, Glen G.; Hollister, Robinson G. Wisconsin Univ. 22 p. Nov. 1969. ED 044 611, EDRS PRICE MF 65¢, HC $3.29. Also available from Industrial Relations Research Institute, 4315 Social Science Building, 1180 Observatory Drive, Madison, Wisconsin 53706. Reprinted from Public-Private Manpower Policies.

Focusing on the evaluation of outcomes ("cost benefit analysis") in large scale social action programs, this paper examines issues relating to the adequacy of theory and methodology as well as the impact of different types of persons (academics, politicians, program administrators) involved in the evaluation process. Problems of evaluation design – control groups, the criterion of replicability (applicability on a wider scale), statistical analysis, and implications of differing socioeconomic criteria – are considered in detail. The authors then propose a deliberately experimental approach which would permit program planners and administrators to learn faster by testing alternative concepts simultaneously. Using an analogy with the court system, they also discuss the potential value of a "rules in evidence" approach to setting standards for acceptance of evaluation results. The document includes 19 footnotes, followed by reprints and other publications by the Industrial Relations Research Institute and the Center for Studies in Vocational and Technical Education.

EDUCATIONAL PLANNING; THE WORLD YEAR BOOK OF EDUCATION, 1967. Bereday, George Z. F., ed.; Lauwerys, Joseph A., ed. 554 p. 1967. Harcourt, Brace, and World, Inc., 737 Third Ave., New York, N.Y. 10017.

The 1967 world yearbook on education contains 25 articles on the theory of educational planning, the major current approaches (social demand, manpower requirements, and cost effectiveness) to educational planning, manpower and educational planning in underdeveloped areas

(specifically, Africa and Latin America), and the creation and use of theoretical models. Relationships between educational and economic planning, historical trends and present patterns in educational expenditures, educational and manpower planning in several of the major industrialized nations, the Mediterranean Regional Project of the Organization for Economic Co-operation and Development (OECD), urban unemployment in Nigeria, primary education and rural employment, the training of planners, and rates of return on educational investments, are among the topics treated. The document includes an index, chapter references, and 79 tables, charts, and figures.

A THEORETICAL STUDY OF THE DEMAND FOR EDUCATION. Oniki, Hajime. Stanford Univ., Calif. 115 p. 1968. University Microfilms, (Order No. 69-8234, MF $3.00, Xerography $7.20) Ph.D. Thesis.

In this study of the economic process of education, individual activities regarding education are treated as a process of overtime resource allocation. The optimum plan for receiving education is investigated in terms of a mathematical model, and the demand for education is derived by examining the effects of changes in parameters on this optimum plan. First, a theory is formulated which concentrates on how to spend one's time between receiving education and engaging in work, and how to divide one's income between paying for education and saving. Costs are analyzed as income spent and wages foregone; benefits are defined as improved labor efficiency and personal satisfaction. The model is then analyzed to reveal characteristics of a person's plan for receiving education. It is shown, among other things, that one generally receives education before engaging in work, that demand for education decreases when funds are scarce or when educational costs rise, and that rising wages can increase or decrease educational demand according to whether the wage shift is proportional or constant at each educational level.

INFORMATION SOURCES AND COMMUNICATION CHANNELS RELATED TO FARM PRACTICES ADOPTION IN CENTRAL INDIA. Sharma, D. K.; Leagans, J. Paul. N.Y. State Univ., Ithaca, Coll. of Agriculture at Cornell. 31 p. 1968. ED 041 210, EDRS PRICE MF 65¢, HC $3.29. Available from Department of Education, New York State College of Agriculture, Ithaca, New York (Single Copy free; additional copies 25¢ each).

The study's main purpose was to identify and describe the roles played by various information sources and communication channels used by Sehore farmers in the adoption of four improved agricultural practices in U.P. District of India. A sample of randomly picked 200 farmers was interviewed by questionnaire. Of the five information sources studied, neighbors were named by all respondents, village level workers by 72%, village chairmen by 26%, and agricultural and university personnel by 20% and 17% respectively. Among the seven means of communication, film demonstrations led by 50%, followed by radio with 38%, audio-visual aids, general meetings, and reading materials. Five adoption stages were recognized: awareness, interest, evaluation, trial, and decision to adopt. Age, education, caste and economic status were discriminating factors, singly or in combination, in the use of all sources except neighbors and village local workers. One major finding was that face to face contacts between agents and farmers had the greatest influence, and mass media the least influence on the adoption.

THE PLANNING AND COST-BENEFIT ANALYSIS OF SOCIAL INVESTMENTS. (In INTERNATIONAL INSTITUTE FOR LABOUR STUDIES BULLETIN, 2/4-47, Feb. 1967). Scott, Norman. Feb. 1967.

This article explains cost benefit analysis, newest of the techniques for assessing the efficiency of public expenditures. Whereas social benefits are excluded from ordinary financial analysis of investment, cost benefit analysis traces effects over the entire period of repercussions on the economy and therefore on present and future social welfare, to reconcile private good with social good and private cost with social cost, so important where the state is increasingly assuming economic responsibilities. General techniques and main characteristics of economic planning are discussed, and a macro-economic planning model devised as a 15-year plan for Poland is described. Questions answered are what to include as costs and benefits, how to value them by establishing shadow prices and opportunity costs, which discount rates to use in reducing future values to present values for comparing present costs, and what technical and social constraints the planner meets. Case studies related to management, industrial relations, and manpower training present cost benefit analyses of manpower retraining in West Virginia, retraining in Connecticut, and rehousing 500 Indian families in South Dakota. Emphasized are implications for economic planning and development of generalized use of cost benefit techniques to apply to sector and national planning levels.

COST-EFFECTIVENESS ANALYSIS FOR THE "WAR ON POVERTY." Besen, Stanley M.; and others. 15 p. 1967. Chapter 10 in Cost-Effectiveness Analysis, edited by Thomas A. Goldman. Available from Frederick A. Praeger, Publishers, New York, N.Y. 10003.

Two anti-poverty programs — investment in education and in highways and other public facilities — should increase earnings and employment through an increase in production possibilities and a fuller utilization of existing resources. In evaluating training programs, there is considerable evidence that training expenditures have a return at least equal to that on other forms of capital investment; the return has both private and social components, and there are direct and opportunity costs to consider. In a Massachusetts retraining program from 1958-61 the "net benefits accruing to society" were evaluated as about $3300 per worker; a similar study in West Virginia showed net returns of about $4000 per worker. The Job Corps and the Neighborhood Youth Corps cannot be judged properly by studying returns to other training programs, since these two programs differ significantly from others. New highways have benefits in real output and employment, new industry, and an increase in land values. There are many questions relating to cost analysis in highway construction which cannot be answered adequately at present. Until programs can be evaluated effectively, large scale financial commitments should not be made; programs should be adequately diversified and steps for evaluation should be set up.

Adult Education—Broad Range Programs

REVIEW AND SYNTHESIS OF RESEARCH ON THE PLACEMENT AND FOLLOW-UP OF VOCATIONAL EDUCATION STUDENTS. Little, J. Kenneth. Ohio State Univ., Center for Vocational and Technical Education. 54 p. Feb. 1970. ED 037 543, EDRS PRICE MF 65¢, HC $3.29. Available also from The Center for Vocational and Technical Education, Ohio State University, 1900 Kenny Rd., Columbus, Ohio 43210. ($1.75).

This review of follow-up studies of graduates of vocational-technical education programs includes studies published since 1965 and covers the major fields of vocational-technical education at secondary, post secondary, and adult levels. Programs for special groups of individuals are also included. Two purposes of the review are (1) to identify the job histories of graduates and (2) to provide baseline data for program evaluation. The review is organized around the following topics: The Role of Followup Studies, General Surveys, Studies of Specific Programs, Summaries of Placement Information, Studies of Special Groups, Benefit-Cost Studies, Followup Studies Procedures, and Evaluation Summary. A 101-item bibliography is included.

RENTABILITE DES INVESTISSEMENTS EN EDUCATION DES ADULTES: ASPECT SOCIAL (THE RETURN ON INVESTMENTS IN ADULT EDUCATION: THE SOCIAL ASPECT). Jobin, Ghyslain. Laval Univ. (Quebec) 10 p. 1968. Text in French.

This study investigated the return on public investments in adult education for the Province of Quebec as well as greater Montreal and Quebec City. Emphasis was on the cost effectiveness of part time and full time formal study at ages 19, 24, 34, 44, and 54. It was found that returns on investments favor full-time over part-time study; that cost effectiveness increases with age and with educational level; and that promoting higher adult education in the Montreal area would prove especially advantageous.

A TEACHER RESOURCE ALLOCATION DECISION-MAKING PROCEDURE FOR AN EVENING INSTRUCTIONAL PROGRAM OF A CALIFORNIA PUBLIC JUNIOR COLLEGE. Tayloe, Ralph Chester. California Univ., Los Angeles. 129 p. 1967. University Microfilms, (Order No. 67-11, 708, MF $3.00, Xerography $6.20). Ed.D. Thesis.

A study was made of the specific cyclical sequence and detailed events needed to allocate available teacher resources to evening division courses at a California public junior college. Using data from interviews with participants and from other sources, a flow chart model was made of the allocation procedure. Sequential activities were described as a part of one of three major segments of the total process: determining foundation courses; assigning resources to such courses; and controlling course enrollment. Findings included the following: (1) foundation courses receive the teacher resources, and are generally the same as courses offered in the last similar semester; (2) foundation courses grow to serve community needs by adding specialized courses or new class sections; (3) average relative instructor cost per student (Spring 1966) was 20.66 mills after six low enrollment classes were cancelled; (4) at the end of the six-week enrollment period, 86% of total capacity was in use, effective cost averaged 24 mills, and departmental costs ranged from 17.75 to 45.87 mills per student hour for each dollar of instructor cost.

CONTINUING EDUCATION: STATE PROGRAMS FOR THE 1970'S. Levin, Melvin R.; Slavet, Joseph S. 157 p. 1970. Available from Raytheon Education Company, D.C. Heath and Company, 475 South Dean St., Englewood, N.J. 07631. Report prepared for the Massachusetts Advisory Council on Education.

Varying needs, largely unmet, were found in the provision of adult education throughout Massachusetts, and recommendations were formulated for an articulated and adequate program. Low priority, weak centers of leadership, and a limited and confused mandate emerged as major

obstacles to effectiveness. It was found that, on the basis of accepted cost benefit criteria, continuing education programs tend to cost relatively little and pay off rather well. Moreover, the potential market for basic education, high school equivalency, citizenship education, occupational training, driver education, staff development and career development for government personnel, and other forms of continuing education far exceeded current levels of activity. A policy declaration was suggested, followed by guidelines for program planning and student recruitment, administrative and organizational changes (including creation of a new division), financial and other measures to strengthen the statewide continuing education system, a network of public relations officers, inservice and other training for state employees, and scholarships for continuing higher education. The document includes an index, a bibliography, 227 chapter references, and seven tables.

A SUMMARY OF ACTIVITIES IN TENNESSEE UNDER TITLE I OF THE HIGHER EDUCATION ACT OF 1965. SECOND PROGRESS AND EVALUATION REPORT. 129 p. Nov. 1968. Tennessee Univ., Knoxville, State Agency for Title I. ED 027 461, EDRS PRICE MF 65¢, HC $6.58.

An evaluative and historical report is presented of 38 university extension programs proposed in Tennessee during Fiscal Years 1966, 1967, and 1968, under Title I (Higher Education Act of 1965), together with a list of 13 programs completed prior to June 30, 1967. The University of Tennessee, East Tennessee State University, Memphis State University, Tennessee Technological University, and 14 other colleges and universities are represented by a total of 87 program involvements in such areas of community action and service as professional continuing education, leadership training and updating of municipal officials, identification of community problems, public health education, urban planning and development, law enforcement, regional economic development, youth opportunities, guidance and counseling, and training in adult education. Recommendations and explanatory comments on scheduling of Federal appropriations, new sources of revenue, development of institutional capacity, problem identification, program development and activity, communication with adult lay leaders, evaluation procedures, and indirect cost determination are offered by the State Agency for Title I as a plan for future action.

UTAH ADULT EDUCATION SERVICES. ADULT EDUCATION REPORT 1968-69. 39 p. May 1970. Utah State Board of Education, Salt Lake City. ED 042 941, EDRS PRICE MF 65¢, HC $3.29.

Major purposes for the preparation of this report on public school adult education in Utah were: to provide the public with a description of achievements, trends, and needs, and with meaningful cost accounting information; to make comparisons and analyses of adult education by program, school district, and year; and to provide the adult education personnel with needed program management and cost accounting information. The topics of discussion include: general adult education; adult basic education; estimation of program resources available for fiscal year 1969-1970; effective use of program resources; adult high school completion; civil defense education; and general educational development. Statistical tables are included.

EFFECTS OF TEAM ARRANGEMENT ON TEAM PERFORMANCE, A LEARNING-THEORETIC ANALYSIS (In Journal of Personality and Social Psychology, 3(5)/541-550, 1966). Egerman, Karl. 10 p. 1966.

Three groups of six two-man teams, differing only in arrangement, underwent two major phases of training — preteam, where each individual developed a proficiency in making a timing response, and team training, where each subject used his timing skill as a team member. Individual preteam proficiencies and the team arrangement were the only two variables used to predict (1) initial team performance, (2) the schedule of reinforcement for each subject, and (3) the manner in which team performance would change from the initial to the final periods of training. This investigation points out the feasibility of applying learning theoretic principles to a study of group behavior. The document includes two tables and 21 references.

Audio Visual

THE IMPORTANCE OF TRAINING REQUIREMENTS INFORMATION IN THE DESIGN AND USE OF AVIATION TRAINING DEVICES. Prophet, Wallace W. George Washington Univ., Washington, D.C. Dec. 1966.

Research is reported on determining the value of present synthetic flight training, and developing programs of instruction to make optimum use of available devices used in army helicopter training. Three equivalent groups of pilots received different training; the trainer group in an expensive sophisticated cockpit trainer, the mock-up group in a less sophisticated plywood cockpit, and the third, in the aircraft. All groups were tested on the aircraft, with the mock-up group doing as well as the trainer group in all procedures. It was concluded that beneficial training can be accomplished in cruder devices that may lack in physical fidelity for successful transfer of training. For efficiency and economy of training and increased flight safety, it is sug-

gested that training devices should be constructed after analysis of training requirements, which are based upon psychological rather than engineering needs; and synthetic training programs should be tested for effectiveness, and provide an effective means of reinforcing infrequently occurring behaviors.

MORE ON PUBLICITY. Selby, David. In Adult Education (London); v42 n5 p. 304-10. Jan. 1970.

THE NEW MEDIA - MEMO TO EDUCATIONAL PLANNERS. Schramm, Wilbur; And Others. United National Educational Scientific and Cult. Org. A-2315. 1967. Available from UNESCO, Place de Fontenoy, 75 Paris-7E, France ($2.95).

This study reviews the educational uses, effectiveness and costs of the new media (radio, television, programmed learning, correspondence study, and films and audio-visual aids) and makes suggestions towards their effective use in education, new media have been used for upgrading instruction, teacher training, extension of education, literacy and fundamental education, adult education and community development. Generally, they have been effective, depending partly on the use to which they have been placed, program content, technical and organizational support, and the context in which reception takes place. Initial, operating, and expansion costs are variable. While the new media entail higher total costs, economies of scale make low unit costs possible, as a guide to planners, check list of 17 key elements related to planning, organization and support, production, reception, and feedback is presented and discussed. Emphasis is laid on the distinctions between production and reception and among technical components, content and teaching, supporting communications and evaluation, and training provisions. Planners are urged to take a systems analysis approach and to view the new media as efficient system components which may be used to meet a recognized educational need.

SECOND SEMINAR ON DIRECT TEACHING BY TELEVISION (SCHEVENINGEN, 1968). 48 p. 1969. Council of Europe, Strasbourg (France). Council for Cultural Co-operation. ED 039 590, EDRS PRICE MF 65¢, HC $3.29.

A seminar on direct teaching by television, held in Rome in December of 1966, created such interest that it was decided to call a second seminar, restricted to adult education, which was held at Scheveningen, July 1-5, 1968. The subject was the assessment of needs and evaluation of results. The purpose was to compare, at a European level, the methods already developed in these two fields, pool experience, and promote coordination between educational authorities and radio and television experts. Many kinds of research can be useful to the assessment of needs, but special stress should be put on the study of society, culture, and personality in one system of interdependent relations, functions, and values. Research into evaluation of radio and television programs must have as its aim to make sure that the needs met have been correctly assessed, that the means employed for meeting needs are the best, that targets have been reached, and that the operation is warranted in terms of cost-effectiveness. There is need for a pilot project, at national and international levels, on evaluation of the results of a series of experimental educational television programs.

A COST ANALYSIS OF MINIMUM DISTANCE TV NETWORKING FOR BROADCASTING MEDICAL INFORMATION. Dei Rossi, J. A.; and Others. 84 p. Feb. 1970. ED 038 988, EDRS PRICE MF 65¢, HC $3.29.

Two specific applications for networks might be used to serve biomedical community: (1) networking of the nation's educational television (ETV) stations for occasional or one-time broadcasting and (2) networking of the nation's medical schools for continuous broadcasting. These two applications are analyzed in detail. A second contribution of this analysis is the provision of data and methodology for examining cost and effectiveness (in terms of physicians and students within broadcasting range) of configurations of subsets of points in the full network. The data and methodology could also be used for determining the maximum cost for networks using media other than broadband television broadcasting, such as audio only broadcasting in conjunction with slides or still pictures. The cost attractiveness of networked, simultaneous broadcasting can also be compared with, for example, sequential broadcasting using mailed video tapes.

DIRECTED PRIVATE STUDY (In Industrial Training International 2(8)/320-322, Aug. 1967). Jones, Lyndon H. 3 p. Aug. 1967.

Directed Private Study (DPS) has evolved from correspondence study, providing some face-to-face teaching to offset the loneliness of the student. New types of courses have been developed combining a period of residence with independent study, such as the two-year correspondence study course in mathematics at Moscow University, the Institute of Management (Kolodje, Czechoslovakia) seven-month boarding and six-month correspondence course, and the program of the Japan State Broadcasting Corporation. An experiment at the University of Wisconsin, "Articulated Instructional Media," in its first program, in library science, provides seminars on campus, independent study, and library projects. Detailed statistics on the comparative costs of

full-time oral instruction, correspondence courses, and Directed Private Study are not available, nor are relative examination successes. However, costs shown take no account of opportunity costs, which tip the balance strongly for DPS schemes if the examination results are comparable. Schemes of DPS should perhaps make use of programmed and taped materials. We must keep much of this work in the public sector.

NEW EDUCATIONAL MEDIA IN ACTION—CASE STUDIES FOR PLANNERS – I. United Nations Educational Scientific and Cult. Org. 206 p. 1967. Available from UNESCO, Place de Fontenoy, 75 Paris-7E, France (A.2285, $4.50).

This volume contains six cases on the use of television, radio, and correspondence study—alone or in combination—for instruction. Educational extension, and adult education and community development in American Samoa (ETV), USA (Hagerstown ETV), Thailand (Educational Radio), Japan (ETV and Correspondence), and Australia (Radio and Correspondence). Most cases were prepared by a team including usually an educator, media specialist, and economist, who presented the history, organization, operation, costs, and evidence of effectiveness for each project. In each case, tables and graphs present the evidence available to the effect that learning does take place and that the new media, while they entail higher costs, can bring down unit costs, depending on how many people are reached. Difficulties in planning, organization and support, production, reception, and feedback are noted, discussed, and pertinent recommendations presented. Not unexpectedly, developing countries tend to have more difficulties – these are traced to technical and financial constraints. They also tend not to benefit from the economies of scale in the use of the new media.

PROGRAMED AV PAYS ITS WAY. Johnson, Lowell R. In Training in Business and Industry; v7 n1 p. 36-39. Jan. 1970.

The Kohler Company found that programed instruction can effectively reduce job training time. Comparison statistics demonstrated the programs more than repaid their costs.

Farm Management Education

ATTITUDES TOWARD ENTREPRENEURIAL BEHAVIOR AND EDUCATION—THEIR RELATIONSHIP TO INSTRUCTION. FINAL REPORT. Kittleson, Howard M. 133 p. Sept. 1969. Minnesota Univ. ED 034 894, EDRS PRICE MF 65¢, HC $6.58.

To evaluate the non-economic returns to investment of resources in education, a study was conducted to determine the effect of farm management instruction on attitudes toward education and farming, relationships existing between attitudes and farm income, and whether students' attitudes became more like their instructor's with increasing years of instruction. The groups in study were: (1) farm families who submitted records for analysis in the 1967 Minnesota Farm Management Program, (2) farm families who had dropped out of the program later than 1964, (3) farm families selected at random from 10 counties, and (4) agriculture instruction responsible for farm management programs. The 70 per cent response to the 90-item attitude instrument revealed a general improvement in attitudes related to more years of instruction, with a strong suggestion of diminishing marginal returns. Families in other than well-organized programs had scores negatively related to instructors; in well-organized programs scores were positively related. All differences in attitudes were vary slight. There is a need for a revision of methods, subject matter, or both if adult vocational agriculture instructors want to claim significantly-improved attitude as a product of their educational program.

THE DEVELOPMENT OF A MODEL DESIGN TO ASSESS INSTRUCTION IN FARM MANAGEMENT IN TERMS OF ECONOMIC RETURNS AND THE UNDERSTANDING OF ECONOMIC PRINCIPLES. Rolloff, John August. 155 p. University Microfilms, (67-6364, microfilm $3.00, Xeroxed copy $7.80).

The records of 27 farm operators participating in farm business analysis programs in five Ohio schools were studied to develop and test a model for determining the influence of the farm business analysis phase of vocational agriculture instruction in farm management. Economic returns were measured as ratios between 1965 program inputs and outputs determined by change in net farm income between 1964 and 1965. Data collected include: (1) the relative change in understanding of profit maximizing economic principles indicated by the change in test scores, (2) the change in farm income indicated by selected economic efficiency factors, (3) the association between understanding of principles and the economic efficiency of farm operators, and (4) the ratio between input cost of instruction and economic returns expressed as net farm income. In pilot trial the test group showed: (1) An improved mean change in test scores, (2) increased volume and economic efficiency in the farm business, (3) a positive association between farm operators' understanding of profit maximizing economic principles and changes in their economic efficiency, and (4) $53.16 increase in net farm income for each dollar expended by farmers on instruction. Refinement of the model procedure was projected as a means of advancing

inquiry into the micro-economic assessment of investments in agricultural education.

EVALUATION STUDY OF FARM AND HOME MANAGEMENT PROGRAM IN NEW YORK STATE. A six-part report. Alexander, Frank D. 238 p. New York State Univ., Ithaca. Coll. of Agriculture at Cornell Univ. ED 018 714, EDRS PRICE MF 65¢, HC $9.87.

In 1954 Congress earmarked funds for a Farm and Home Management Program to offer intensive on-the-farm counseling in management and decision making. This six-part evaluation of the Program as it was conducted in New York State, primarily with dairy operators, was designed to determine the program's effectiveness relative to less intensive programs. Part 1 establishes the representativeness of 250 participants in the evaluation sample by comparing them to 150 nonparticipants on such matters as size of herd and farm receipts. Part 2 is the agricultural and home demonstration agents' description of the program as reported on questionnaires. Part 3 examines the program through the eyes of administrative staffs. A case study reveals the amount of exposure of 25 participating families to 58 different topics in the program, such as analysis of farm expenditure and agronomy. A study of a three-township area opens to question the hypothesis that the neighborhood automatically functions as an information diffusion channel. A cost-benefit study using the agents' time input as major costs and the farm operators' changes in labor incomes as benefits, indicates that the average labor income advantage of 87 participants in 1959 exceeded the cost of the program. (Tables provide statistical data.)

THE CHANGE AGENT AND THE PROCESS OF CHANGE. RESEARCH BULLETIN 17. Nielson, James. 100 p. 1967. Michigan State Univ. ED 029 180, EDRS PRICE MF 65¢, HC $3.29.

As a final chapter in the research to evaluate the impact of the Michigan township extension experiment, this report focuses on why and how change came about, what factors appear to be most closely related to change, and the ways in which change agents can most effectively help bring about change. In the experiment, extension agents worked intensively with farm families in five township areas for five years; one of the major objectives was to develop and test techniques for increasing agricultural output. It was found that farmers in experimental areas adopted improved farm practices faster and stepped up their use of inputs more than farmers in matched control groups. Average value of total farm output increased $5,600 on experimental farms as compared to $3,400 on control farms. Net farm earnings for the experimental sample increased an average of $1,646 as compared with $938 for the control sample. Benefit-cost analysis showed that the program cost $117 per farm per year. The differential increase in net earnings during the five-year experimental period exceeded the total costs of the program by two and one-half times. Included are 32 tables, 14 references, and a model of relationship among types of variables studied.

RETURNS TO HUMAN AND RESEARCH CAPITAL, UNITES STATES AGRICULTURE, 1949-1964. Fishelson, Gideon. 121 p. North Carolina State Univ. University Microfilms, (Order No. 69-7656, MF $3.00, Xerography $6.00) Ph.D. Thesis.

This study estimated rates of return to public investments in human and research capital (formal schooling and extension and vocational agricultural education) in the United States agricultural industry. (Southern states were excluded because of demographic and educational factors that would have biased the variables.) Output per farm was defined in terms of human capital, research at state agricultural experiment stations, and inputs of land, labor, machinery, other expenditures, and fertilizer. The lag distribution of research was identified with the rate of adoption of hybrid corn in corn belt states. Values of marginal product ranged from $0.25 to $0.61 per dollar per year (schooling), $4.96 to $19.86 (extension and vocational agricultural education), and $5.81 to $15.28 (research). Ranges for internal rates of return were 9.6% to 61%, 196% to 636%, and 24.6% to 43.1%, respectively. Conclusions justified additional investments in these kinds of education and research.

AN ECONOMIC STUDY OF THE INVESTMENT EFFECTS OF EDUCATION IN AGRICULTURE, FINAL REPORT. Persons, Edgar A. and Others. 175 p. Apr. 1968. Minnesota Univ. ED 021 989, EDRS PRICE MF 65¢, HC $6.58.

To determine the absolute economic return to adult farm business management education, the diminishing marginal return effect from added increments of education, and benefit-cost ratio of the educational program for participants and the sponsoring community, data were collected from 3,578 farm business records representing farmers enrolled in farm business management education in 1959-65. Farmers participating in the educational program were generally younger, better educated, and more affluent than the average farmer described in census data. Polynomial curvilinear regression statistical techniques describe the relationship between investment in farm business management education and three measures of economic success: farmer's labor earnings, return to capital and family labor, and total farm sales. Farmer's labor earnings and farm sales increased rapidly during the first three

years of instruction, declined for the fourth, fifth, and sixth years and then increased rapidly in subsequent years. The benefit-cost ratio for individual farmer participants was 4.20:1. The community benefit-cost ratio when increased business activity was measured by increased farm sales was 9.00:1. This study assists in establishing a rationale for educational programs to increase community assets and describes an educational model for efficient program operation and growth.

INVESTMENTS IN EDUCATION FOR FARMERS: SUMMARY OF AN ECONOMIC STUDY OF THE INVESTMENT EFFECTS OF EDUCATION IN AGRICULTURE. Persons, Edgar A., and Others. 54 p. Jan. 1968. Minnesota Univ. ED 021 951, EDRS PRICE MF 65¢, HC $3.29.

To investigate the value of an educational investment for farmers and the community, a study was initiated to examine the relationships between costs and benefits. An instructional program in farm business and resource management from 1959-65 was considered as the educational investment, and benefits were assessed by examining 3,518 business records of enrolled farmers. A benefit-cost analysis revealed: (1) A farmer can expect to realize about $4 of labor earnings for each dollar of investment in educational programs in farm business and resource management, (2) Where the benefits to the community were calculated as an aggregate rise in farm labor earnings and the cost included the aggregate cost borne by the community the ratio was approximately 2:1 where the cost included farm sales as a measure of business activity the ratio was 9:1, (3) Diminishing marginal return effects were observable in educational investments, (4) Over the 6-year period the cost effectiveness of the educational program was not constant, and (5) A rigorous, highly structured, and goal directed educational program in farm business management proved to be an excellent educational investment for the communities in this study.

OJT and MDA

THE EVALUATION OF SELECTED PRESENT AND POTENTIAL POVERTY PROGRAMS. Muth, Richard. Institute for Defense Analyses, Arlington, Va. 91 p. Jan. 1966. Available from NTIS (AD-682-203, MF 65¢, HC $3.00).

The study attempts to evaluate the efficiency of two types of alternative programs aimed at increasing the incomes of poor families. It deals with programs involving education and training as well as those which represent direct measures for increasing family income. In order to compare such programs, a common measure of efficiency is needed. The one chosen here is the annual cost to the Federal government of raising income by $100 per year until the worker reaches age 65. A rate of 9% is used to discount future income. In evaluating education and training programs, the criterion applied in judging benefits is not the change in employment but the increase in the workers' future earnings. In the absence of adequate data on the benefits of education and training programs, it was assumed that Head Start or nine months of MDTA or Job Corps training would yield the same average increase in earnings as an additional year of high school education. The document includes 22 tables, with appendixes on Federal cost factors and the determination of family income.

A CRITIQUE OF COST-BENEFIT ANALYSES OF TRAINING (In Monthly Labor Review, 90(9)/45-51). Sewell, David O. 7 p. Sep. 1967.

This edited version of a critique of cost-benefit analysis illumines the difficulties encountered in measuring the returns from on-the-job training accruing to the individual, society, and government. Its hypothesis, that findings from studies on the Manpower Development and Training Act projects do not transfer to the War on Poverty, supports a request for funding a cost-benefit analysis on training the poor under the Manpower Improvement Through Community Effort project in North Carolina. It criticizes generalizations that have been based upon three published analyses of training schemes conducted under the MDTA Act of 1952, the Area Redevelopment Act of 1961, and earlier State equivalents. It points up such difficulties as (1) treating populations of the poor and unemployed as the same, (2) considering that improvement in income or employment are not the only benefits, and (3) trying to calculate the value of complementary demands for labor created by using the newly trained.

AN EVALUATION OF INSTITUTIONAL VOCATIONAL TRAINING RECEIVED BY AMERICAN INDIANS THROUGH THE MUSKOGEE, OKLAHOMA AREA OFFICE OF THE BUREAU OF INDIAN AFFAIRS. Blume, Paul R. Oklahoma State Univ. 261 p. May 1968. University Microfilms.

The adult vocational training received by Indians under Public Law 959 was evaluated to determine benefits of institutional training programs and to develop manpower policy recommendations. Criteria of the evaluation included employment experience, income, labor force attachment, and benefit cost ratio. Of the approximately 670 Indians who received adult vocational training, information was obtained for 220 from school files and by mailed questionnaire. Some trainee characteristics were: (1) The average trainee was better educated than the average Indian, (2) The employment and income levels

were low by most standards, (3) There was a fairly high noncompletion rate among the trainees, and (4) There was some indication that the questionnaire response rate was partially affected by the cultural and historical background of the trainees. Conclusions were: (1) Completion of training results in an average increase in income of $1,929, (2) The average increase in employment was about 3 and one half months of additional employment, and (3) The social benefit cost ratio was found to be 2.39.

TRAINING THE UNEMPLOYED. Somers, Gerald G. (Document not available from EDRS.) Chapter 11 in IN AID OF THE UNEMPLOYED, edited by Joseph M. Becker. 25 p. 1965. Available from The Johns Hopkins Press, Homewood Campus, Baltimore, Md. 21218.

Recent government training programs (largely under the Area Redevelopment Act of 1961 and the Manpower Development and Training Act of 1962) are discussed. By examining results of early experience under Federal legislation, some of the conflicting views on the value of these programs are assessed. An account is given of the content, methods, and procedures of retraining surveys in West Virginia and elsewhere, with emphasis on job placement, training-related job vacancies, selection, trainee characteristics, attitudes of nontrainees and dropouts, retraining as an inducement to mobility, and the relation to need and to subsequent employment. Company and union programs, collective bargaining, and Federally subsidized on the job training, and retraining in Canada and Western Europe are reviewed. Last to be discussed are the gains and costs of investment in human capital. It is concluded that existing public and private programs must be expanded and integrated with other labor market policies and must entail constant retraining and upgrading, relocation allowances, and improved placement and guidance services.

THE ECONOMIC EFFECTIVENESS OF RETRAINING THE UNEMPLOYED, A STUDY OF THE EXPERIENCE OF WORKERS IN CONNECTICUT. Borus, Michael E. Yale Univ. 228 p. June 1966. (Ph.D. thesis) (Research report to Federal Reserve Bank of Boston, 35). ED 010 865, EDRS PRICE MF 65¢, HC $9.87.

A study was made of retraining programs in 4 labor markets in Connecticut, under both Area Redevelopment Act and state sponsorship. The purpose was to determine the benefits and costs to workers, government, and the economy. The state had pioneered in such programs so a sample could be studied of those who had long work histories after retraining. The trainees were divided into six groups—those who completed the course with and without employment, those who withdrew, with and without employment, and those who refused retraining, with and without employment. Three control groups were trainees who, without employment, completed the course, withdrew, or refused it. The benefit cost ratio for the individuals (such as reduced annual unemployment and increased annual wage vs. income lost during training and higher income tax afterwards) was not as high as the benefit to the government (such as reduced costs of unemployment and public assistance), and to the economy (the increase in gross national product and reduced aggregate unemployment level). It was felt that the beneficial effects of the retraining programs might be lowered by the addition of the Manpower Development and Training Act provision for training the hard core unemployed.

THE EVALUATION OF GOVERNMENT PROGRAMS: THE CASE OF NEW HAVEN'S MANPOWER TRAINING ACTIVITIES. Goldfarb, Robert S. 260 p. 1968. Yale Univ., Ph.D. Thesis. Available from NTIS (PB-182-173, MF 65¢, HC $3.00).

This thesis attempts to deal with difficult methodological problems of program evaluation; the particular programs considered are two types of manpower training programs: institutional or "classroom" training and government-subsidized on-the-job training. Characteristics of cost-benefit analysis are investigated and the method is critized for use in analyzing manpower programs. Two data sources are used to study the production process. First, a group of trainees who underwent each type of training were interviewed. Second, employers who participated in the OJT program were interviewed, as were a group of the largest employers in the New Haven area.

MANPOWER TRAINING: SOME COST DIMENSIONS. Young, Stanley. 51 p. n.d. Massachusetts Univ., Amherst. Labor Relations and Research Center. ED 027 390, EDRS PRICE MF 65¢, HC $3.29.

Some of the dimensions of the relative financial contribution of the cooperating parties in manpower institutional training as established under the Manpower Development and Training Act of 1962 were explored. This analysis will provide some perspective to those who must finally decide the question of relative financial contribution, or provide them with a certain range of the cost dimensions of the program. Discussed in this document are: (1) some cost dimensions of manpower training, (2) total cost of the manpower development program, (3) space, equipment, program planning and on-the-job institutional training, (4) indirect cost, (5) cost requirement, (6) individual educational return, (7) the training gap, (8) cost effectiveness, (9) MDTA as a bridge

between industry and education, (10) new occupations, (11) public relations and community liaison, (12) MDTA contribution to local training effort, (13) the Keene, New Hampshire project, (14) educational innovation, (15) some problems. It was recommended that an integrated decision-making system in the occupational training area be developed to insure that the total occupational training effort of the Federal Government achieves the worthy goal of training all individuals to their full capacity.

A BENEFIT-COST ANALYSIS OF THE NEIGHBORHOOD YOUTH CORPS: THE OUT-OF-SCHOOL PROGRAM IN INDIANA. Borus, Michael E.; and Others. In Human Resources; v5 n2 p. 139-159. Spr. 1970.

Neighborhood Youth Corps (NYC) out-of-school programs in Indiana were studied to determine benefits to society from training and employment efforts—increased aggregate output and increased employability of participants. Benefits in enrolling male participants were considerably higher than those derived from enrolling females; ratio was at least two to one for males and less than one for females. Assuming the same costs for participants, benefits from enrolling trainees with less than nine years of education were substantially greater than training more educated enrollees. For participants, benefits varied with the duration of enrollment; for males and some females, the longer participation the greater was the increase in post-program earnings. These findings differ significantly from previously published studies. Also, contrary to earlier findings, males gained more from participation than did females. This conclusion may, however, be due to differing demographic characteristics of the enrollees. Furthermore, although a correlation is assumed between length of participation and derived benefits, perhaps those qualities which were associated with an individual's longer participation in the program were also related to his increased earnings.

HOW FARE MDTA EX-TRAINEES? AN EIGHTEEN MONTHS FOLLOW-UP STUDY OF FIVE HUNDRED SUCH PERSONS. 219 p. Dec. 1967. London, H. H. Missouri Univ., Columbia Office of Manpower Polity, Evaluation, and Research (DOL), Washington, D.C. OEC-81-24-25. Available from NTIS (Order No. FB 177626, MF 65¢, HC $3.00).

This study examined the socioeconomic background characteristics of Manpower Development and Training Act ex-trainees, the socioeconomic changes that occurred after training, the long-and short-range effectiveness of the services received under the MDTA program, and how these may be improved. For approximately 500 persons who completed an MDTA program in St. Louis, Kansas City, and Joplin, Missouri, from October 1, 1964 through September 30, 1965, followup interviews were held at 6-, 12-, and 18-month intervals, and employers rated their performance following each of the three interviews. Additional data were collected from the records of relevant state and local public agencies. Some findings were: (1) 21.4 per cent of the ex-trainees were receiving some form of welfare for an average of 14.8 months some time during the 18 months preceding training, (2) Pretraining work history was both erratic and irregular, (3) Personal service, semiskilled, skilled, and unskilled, in that order, together with clerical, accounted for the majority of post-training jobs, and (4) Neither the type of job nor the wages received seemed to have any appreciable bearing on attitude toward the job, and most liked their work very well or fairly well. Findings led to 10 major conclusions and six recommendations for improvement of MDTA programs. Copies of the data-gathering instruments used and 62 detailed statistical tables are included.

A BENEFIT COST ANALYSIS OF THE SOUTH CAROLINA MDTA PROGRAM. PRELIMINARY REPORT. 64 p. South Carolina Univ., Columbia. Bureau of Business and Economic Research. ED 029 980, EDRS PRICE MF 65¢, HC $3.29. Also available from the Bureau of Business and Economic Research, University of South Carolina, Columbia, South Carolina 29208, (without charge).

Manpower Development and Training Act (MDTA) programs completed in 1965 were evaluated by benefit-cost ratio and internal rate of return. Initial annual earnings differential figures at $525,650 and $719,629 were projected into the future at various rates of promotion and various rates of discount on the benefit stream. Resulting lifetime benefits (for 30 working years) range from $2,556,110 at a zero promotion rate and 20 per cent discount rate on the first figure to $15,162,977 at a 3.5 promotion rate and a 5 per cent discount rate for the $719,629 figure. These projected benefits may be compared with the total program cost of $3,097,616. On the other hand, the internal rates of return on the training outlay of $3,097,616 range from 16.29 per cent at zero rate of promotion for the $525,650 figure to 26.20 per cent at the 3.5 rate of promotion for the $719,629 figure. An alternative for the cost outlay would have to exceed the rate of return if the training were to be considered economically unprofitable. It was concluded that, under the circumstances and assumptions of the study, training conducted under MDTA is worthwhile with benefits greatly exceeding costs and internal rates of return high. Assessments of individual programs are also provided.

BENEFIT-COST ANALYSIS OF TAT PHASE I WORKER TRAINING. TRAINING AND TECHNOLOGY PROJECT. SPECIAL REPORT. Kirby, Frederick C.; Castagna, Paul A. 34p. July 1969. Atomic Energy Commission, Oak Ridge, Tenn. ED 034 039, EDRS PRICE MF 65¢, HC $3.29.

The purpose of this study is to estimate costs and benefits and to compute alternative benefit-cost ratios for both the individuals and the Federal Government as a result of investing time and resources in the Training and Technology (TAT) Project. TAT is a continuing experimental program in training skilled workers for private industry. The five occupational areas included in the study are mechanical drafting, welding, machining, industrial electronics, and physical testing-quality control. Data were obtained by analyzing two samples of 70 persons each; one sample selected from 407 TAT trainees, the other sample from 1,500 qualified applicants not admitted because of limited space. The methodology, the cost of training to the Federal Government, the expected value of income differences between the trained and control groups by year, the expected value of tax differences accruing to the Federal Government by year, and the computation of the number of deductions per pay check are appended.

CONTRIBUTIONS AND COSTS OF MANPOWER DEVELOPMENT AND TRAINING. POLICY PAPERS IN HUMAN RESOURCES AND INDUSTRIAL RELATIONS, NO. 5. Mangum, Garth L. Michigan Univ. 95 p. Dec. 1967. ED 021 949, EDRS PRICE MF 65¢, HC $3.29. Document also available from Publications Office, Institute of Labor and Industrial Relations, Museums Annex, Ann Arbor, Michigan 48104 ($2.00).

As a part of a larger project under grant from the Ford Foundation to evaluate federal manpower policies and programs, this evaluation of the training efforts under Title II of the Manpower Development and Training Act (MDTA) made use of data provided by the Departments of Labor and Health, Education, and Welfare. By the end of fiscal 1967, 1.2 billion dollars had been obligated for training the unemployed and underemployed under Title II of the Act. As the combined result of original congressional intent and subsequent experience, MDTA induced programs have come to have six potential and identifiable objectives: (1) facilitating employment of the unemployed, (2) reducing poverty, (3) lessening inflationary pressures, (4) meeting labor shortages, (5) upgrading the labor force, and (6) revamping traditional institutions. On the basis of a detailed analysis of both quantifiable and nonquantifiable accomplishments, the extent to which each objective has been achieved is examined and estimates of the overall costs of the program are made before turning to a review of cost-benefit studies for comparison with previous conclusions. The results of the appraisal are clearly favorable. In general, every current component may not pay, but the overall contributions of the program have exceeded its costs by a margin which not only merits support but justifies expansion.

A BENEFIT COST ANALYSIS OF MANPOWER RETRAINING (In Proceedings of the 17th Annual Meeting, Industrial Relations Research Association, Chicago, Dec. 28-29, 1964, pp. 172-85). Somers, Gerald G., and Stromsdorder, Ernst W. 16 p. 1965.

In a study (1962-64) designed to evaluate benefits and costs of manpower training, 1379 West Virginia workers were surveyed—501 Area Redevelopment Act or Area Vocational Training Program trainees, 233 program dropouts, 65 who were accepted but did not report, 127 "rejects", and 453 randomly chosen nontrainees (the control group). By the summer of 1962, 60 per cent of trainees were employed versus 56 per cent of the dropouts and about a third of the others. A year later, employment rates were up for all groups, with 71 per cent for trainees and slightly less for other groups. About 12 per cent of successful trainees were out of the labor force (Summer 1962), with similar percentages among the others. Trainees consistently had higher rates of employment than others of comparable age, educational level, or employment background. Between 70 and 75 per cent of trainees have found jobs, almost all in training related occupations, and earnings (especially among men) have substantially increased. Payback periods (time required for differential earning gains to offset total retraining costs) have tended to be short, especially for men, and shorter for individuals than for society. Overall results indicate that the benefit and potential benefits of manpower retraining will greatly outweigh costs regardless of local circumstances. Document includes footnotes and 3 tables.

DETERMINANTS OF RATES OF RETURN TO INVESTMENT IN ON-THE-JOB TRAINING. Rasmussen, Dale Bruce. Southern Methodist Univ. 159 p. Mar. 1969. Available from NTIS (PB-184-024, MF 65¢, HC $3.00). Ph.D. Thesis.

The study evaluates public investment in on-the-job training (OJT) and tries to identify systematic determinants of the profitability of this investment. Profiles of age and earnings by occupation are estimated for the South and other regions, and for whites and non-whites, from data in the one-in-1,000 census sample and are then adjusted to the regional level using wage survey indexes. Concepts of profitability reflect three

kinds of assumptions: (1) transfers (government expenditures for allowances to trainees) are not a cost; (2) transfers are a cost; (3) increases in tax revenue are the sole benefit derived from OJT. The methodology of the study is an aggregate approach to evaluating investment by utilizing detailed information describing individuals.

THE ECONOMIC EFFECTIVENESS OF ON-THE-JOB TRAINING: THE EXPERIENCE OF THE BUREAU OF INDIAN AFFAIRS IN OKLAHOMA. Scott, Loren C. In Industrial and Labor Relations Review; v23 n2 p. 220-236. Jan. 1970.

In 1958 the Bureau of Indian Affairs (BIA) instituted an on-the-job training program (OJT) in which Indian participants could increase their skills through work experience. As an incentive to firms to undertake this training, a partial wage subsidy was provided. Indians desiring OJT were screened by the Bureau and then referred to the firm for employment and training. Information obtained from participating employers suggests that the length of training periods is generally too long. A theoretical framework for benefit, cost analysis of the program was developed along the following dimension: (1) private benefits; (2) social benefits; (3) private costs; and (4) social costs. The private, explicit benefits are reflected in changes in earning and employment experiences of the trainees. These benefits are impressive since trainees earned an average of $125 more per month after participation. Due to the relatively small number of participants entering any one occupation, it is unlikely that there was any significant change in the labor supply in that field. Though there were no private costs to the trainee, taxpayers did bear the expense of providing the training. Data are also presented in this article regarding completion of training, characteristics of the trainees, and productivity differentials.

RETURNS FROM INVESTMENT IN SCHOOLING AND ON-THE-JOB TRAINING. Johnson, Thomas. 133 p. 1969. North Carolina State University at Raleigh. University Microfilms, (Order No. 70-9191, MF $3.00, Xerography $6.40). Ph.D. Thesis.

This study was made to develop a model which will predict lifetime earnings and to use this model to investigate the relation between schooling and on-the-job training (OJT) as a function of race and regions, trying to distinguish earnings differences due to differences in the return on investments made and differences in opportunities to make investments in OJT. The model was developed by representing an individual's investment in human capital as a continuous process, rather than a series of discrete investments. The data employed were the earnings profiles by race and region which Hanoch (1965 and 1967) estimated from the 1960 census one-in-1,000 sample survey. Results indicated that, for most levels of schooling, it cannot be shown that non-whites received a lower rate of return than whites; and that for most of the region-schooling groups, nonwhites also invest at least as large a fraction of their earning capacity in OJT as do whites. It was concluded that the model developed can well predict the average earnings streams of broad aggregates of persons. However, problems were met in data limitations on estimation of base earnings capacity and there was a problem of identifying discrimination. It is of interest that marginal market discrimination was indicated at only a few schooling or skill levels.

Training—General

A GENERALIZED NETWORK MODEL FOR TRAINING AND RECRUITING DECISIONS IN MANPOWER PLANNING. Charnes, A.; and Others. Carnegie-Mellon Univ. 16 p. May 1970. Available from NTIS (AD-711-836, MF 65¢, HC $3.00).

Models for manpower planning previously devised for the U.S. Navy's Office of Civilian Manpower Management have all utilized goal programming constructs with embedded Markoff processes. These models — referred to as 'OCMM Models' — are here extended to include training elements along with related constraints.

COSTS AND BENEFITS OF ADULT RETRAINING IN THE UNITED KINGDOM. Ziderman, A. In Economica; v36 n144 p. 363-376. Nov. 1969.

Indirect effects of retraining on the resources of the economy include an increase in the number of skilled workers in an area which suffers from a shortage of qualified; but if retrained workers merely displace other, less qualified, workers who join the unemployed, then there is no benefit to the economy. A relatively accurate and commonly used method for measuring the economic benefits of retraining is to compare the performance over a period of time of a group of retrained workers with a control group who were not trained. This method fails to take into account the inherent qualities of the workers chosen for retraining. The situation is aggravated if (as in Great Britain) retraining is given to employed workers as well as to the unemployed. Despite the complexity of the retraining cycle, it is possible to calculate the over-all return to society of investing resources in government programs. On the basis of figures for the year 1966, a table has been drawn up which shows costs, benefits, average pay-back period, and rate of return. The drawback is that these figures do not take into account the indirect effects (vacancies created by workers being trained, retrained workers

displacing others, etc.). The method is useful but the availability of data on the indirect effects might well produce different results. The results can, therefore, only be considered indicative of the positive benefits of retraining.

TRAINING COSTS WITH REFERENCE TO THE INDUSTRIAL TRAINING ACT. Garbutt, Douglas. 210 p. 1969. Available from Gee and Company (Publishers) Limited, 151 Strand, London W.C. 2, England (52s 6d).

Provisions and implications of the British Industrial Training Act of 1964 (including the system of training grants and levies) are set forth. Procedures for accounting and budgeting for training costs, routines for collecting training information, documents (budgets, cost sheets, control statements) for collecting and controlling costs, means of estimating expenditures for training activities, and steps in planning the training function for optimum costs and benefits are also discussed. The point is stressed that, while data on how much training is done by a firm must be gathered if grants are to be obtained, relatively minor adjustments from previous methods of data gathering will suffice. Personnel payments and fringe benefits, overhead, production, insurance, administration, transportation and travel, depreciation, materials, and other cost categories are suggested for calculating training costs. The document also includes a diagram of the industrial training system, based on cooperation by industry with the Departments of Technology and Labour; descriptions of a graduate training and a student trainee scheme; lists of statutory instruments affecting the Civil Air Transport Board and the engineering industry; and 78 other figures.

OPERATOR TRAINING IN INDUSTRY. Seymour, W. Douglas. 55 p. 1965. Institute of Personnel Management, London (England). Available from Institute of Personnel Management, 80 Fetter Lane, London E.C. 4, England (7s 6d).

Guidelines and objectives are set forth for more effective training of machine operators and other semiskilled and unskilled industrial workers. Basic kinetic and perceptual elements of manual skill development are briefly reviewed. Operative training itself is analyzed under the following headings: handwork without tools; handwork with tools; single purpose machine work; multiple purpose machine work; group machine work (as in cotton weaving); and nonrepetitive work involved in such activities as inspection and steelmaking. Nine figures and 24 references are included.

CONCEPTUAL ISSUES IN EVALUATING TRAINING PROGRAMS. Weisbrod, Burton A. In Monthly Labor Review, v89 n10, October 1966. 7 p. Oct. 1966.

Based on the assumption that training programs ordinarily involve both benefits (advantages) and costs (disadvantages), this article discusses the form of such effects in the manpower training area, and presents some suggestions regarding measurement methods. The need to evaluate training programs in terms of their effects on efficiency of resource allocation and on the distribution of income is underscored.

C-130 PHASE I PILOT TRAINING PROGRAM (CCTS). Shaw, Jack B.; and Others. 172 p. Apr. 1969. Tactical Airlift Center, Pope AFB, North Carolina. Available from NTIS (AD-700-987, MF 65¢, HC $3.00).

This is a detailed study of the C-130 Phase I (CCTS) pilot training program conducted by the 442nd Combat Crew Training Wing at Stewart Air Force Base, Tennessee. The purpose of the study was to determine the most effective training program that will continue to produce highly qualified pilots at the least cost. The program was evaluated and compared with other representative military and civilian training programs. Analysis of the program was concerned with increases in graduate quality and simultaneous decreases in student pipeline time and training costs. Changes proposed include revision of existing program using the system approach and programmed learning in the course curriculum. Portions of this document not fully legible.

MEASURING THE EFFECTIVENESS OF SALES TRAINING. Gillam, A. In Marketing World, p. 14-17. May, 1970.

There is a need to look at sales training afresh, to re-examine the objectives. Simple yardsticks for measuring salesmen performance are: number of calls per day; number of orders per day; percentage of orders to calls. These apply only to comparatively simple sales situations. A more thorough and complex investigation would: define responsibilities and job specifications of the sales organization; examine them in relation to the company's sales objectives; examine records and controls; see how salesmen's reports and orders are handled in the sales office; establish true objectives; and record current performance levels of salesmen. The extent to which results can be measured will depend very much on the nature of the particular sales operations; but some attempt should be made to put a finite measure on training. Industrial training boards have given a big boost to salesman training, and new techniques built around the company's specific sales policy are being developed. However, before an Industrial Training Board will part with its money, it will have to be persuaded that sales training really works.

CONTROL OF THE TRAINING FUNCTION IN THE ENGINEERING INDUSTRY. Baker, H. A. In Training Officer; v6 n1, p. 14-17. Jan. 1970.

Levy and grant provisions under the Engineering Industry Training Board in Great Britain are discussed as a basis for procedures in analyzing and reporting on training costs and benefits.

COST CONTROL OF TRAINING—DOES IT MAKE SENSE? Longley, James. In Industrial Training International; v4 n11, p. 471-474. Nov. 1969.

THE TRAINING FUNCTION: OVERHEAD OR PROFIT? Livingston, Henry S. In Training and Development Journal; v24 n8, p. 18-24. Aug. 1970.

PLANNING INDUSTRIAL TRAINING. Evans, Eric; and Others. 46 p. Nov. 1968. National Institute of Adult Education (England) London. Available from National Institute of Adult Education, 35 Queen Anne St., London W. 1, England (10s 6d).

Under the pressure of economic conditions and the stimulus of the Industrial Training Act, industrial and commercial firms in Great Britain are acting more and more in the belief that training is inseparable from the mainstream of their activities. This pamphlet is concerned with issues of practical importance in this context: the relative importance of training directed to different levels of skill; prediction of likely performance as a basis for selection of trainees; the role of training officers in higher decision making; and techniques for evaluating the return on training expenditures. Included are chapter references, an interview form, a training system outline, cost effectiveness curves, and statistical data on labor force skills, occupational and employment trends, recruitment and training expenditures, and course results from two experimental pre-apprentice programs.

COST-BENEFIT ASPECTS OF MANPOWER RETRAINING. MANPOWER PAPERS NO. 2. 42 p. 1970. Great Britain. Dept. of Employment and Productivity, London (England). Available from Her Majesty's Stationery Office, London, England. (4s 6d).

This study brings together the extensive literature on the subject and discusses the need for, and advantages of, retraining; the provisions for retraining made in the United States and Sweden; and possible approaches to cost-benefit analysis of retraining. For the individual, manpower retraining is well worthwhile, since it leads to considerable gains in employment and income. For the government and the economy, the studies revealed that investment in manpower retraining is even more worthwhile, although the exact magnitude of the benefit-cost ratios is difficult to estimate because of the existence of externalities. Manpower retraining can help alleviate resource bottlenecks if directed toward areas of skill shortage. This will not only help in the fight against inflation; it will also facilitate a more general expansion of the economy. In a tight market, those who remain unemployed will increasingly represent the "hard-core" unemployed. The object of the program should be to increase their employability so that they can be reabsorbed into the system. In a slack labor market, job vacancies can still be filled, especially if retraining courses are geared to the needs of individual employers. However, it is in a depressed market that large-scale preparations can be made for future expansion. Further research is required to compare the benefit-cost ratios of institutional training with those of on-the-job training.

TECHNICAL PROGRESS AND TECHNICAL SCHOOLS. Pejovich, Svetozar. In Review of Social Economy; v26 n1, p. 40-49. Mar. 1968.

Cost effectiveness analysis of the provision of training or retraining for those whose job stability is threatened by technical progress may suggest the superiority of specifically oriented on-the-job training to more generally oriented technical school training, contrary to first impression. The possibility is suggested that training in technical schools may provide the trainee with a higher income, but that on-the-job training may provide the trainee with greater assurance against cyclical unemployment. If this is true, then government investment in training programs should not be based on the assumption that the trainees would prefer higher income to the lessened likelihood of unemployment. Investment in research to arrive at a better theoretical understanding of which choice the affected individuals would make is better merited than investment in trial-and-error retraining programs.

MANPOWER REPORT OF THE PRESIDENT, INCLUDING A REPORT ON MANPOWER REQUIREMENTS, RESOURCES, UTILIZATION, AND TRAINING. STATISTICS ON MANPOWER. A SUPPLEMENT TO THE MANPOWER REPORT OF THE PRESIDENT (March 1961). 372 p. Jan. 1969. U.S. Dept. of Labor, Washington, D.C. ED 032 392, EDRS PRICE MF 65¢, HC available from U.S. Government Printing Office, (L.1.42/2-2:969, $1.00; L.1.42/2:969, $2.00).

The seventh annual manpower report is presented in three parts: The Employment Record, Manpower Policy and Programs, and Manpower Research and Experimentation. Discussion of the employment record addresses employment developments and their economic background, patterns of employment growth, unemployment and underemployment, developments in the labor

force, and productivity. Sub-divisions of the section on manpower policies and programs include manpower development through the schools, enlisting private industry cooperation, and meeting individual needs. The focus of manpower research was on manpower requirements and resources, joblessness, occupational training, job market processes, and equal employment opportunity. Experimental and demonstration programs are discussed relative to program accomplishments, impact on legislation, and inter-agency cooperation. A cost-effectiveness analysis of manpower programs, an evaluation of manpower programs, and statistical tables on the labor force, employment, unemployment and training are appended.

RETRAINING THE UNEMPLOYED. Somers, Gerald G., ed. 350 p. 1968. Available from University of Wisconsin Press, Box 1379, Madison, Wisconsin 53701 ($10.00).

Case histories evaluate the effectiveness of recent and current retraining programs for unemployed workers under Federal, state, municipal, and union-management auspices, judging them by their success in placing workers in useful employment in distressed economic areas. Data on various aspects of retraining programs under a wide variety of circumstances have been assembled, and retrainees are compared with such control groups as rejected applicants, trainees who dropped out before completing their courses, and unemployed workers who did not apply for retraining. Through cost benefit analyses and other evaluation of specific programs in West Virginia, Connecticut, Massachusetts, Michigan, Tennessee, and southern Illinois, and the cities of Chicago, Fort Worth, and Omaha, where such factors as the personal characteristics of trainees, the labor market, institutional placement, and procedural arrangements varied widely, significant conclusions have been drawn as to the economic and other benefits of retraining programs in general. The document includes chapter references, appendixes, and 114 tables and figures.

LEVY AND GRANT SCHEMES: THEIR CONTRIBUTION TO THE ACHIEVEMENT OF THE INDUSTRIAL TRAINING ACT. Dawson, Peter. In Industrial Training International; v3 n10, p. 471-3. Oct. 1968.

There is growing questioning of the contribution of levy and grant schemes to the achievement of the aims of the Industrial Training Act of Great Britain – to enable decisions on the scale of training as related to economic needs and technological developments, to improve the overall quality of training, and to spread the cost more fairly. A simpler and cheaper approach would be for boards to make grants for all employees who left firms and who had attended approved training during the 12 months before they left and for levies to fall on firms who were recruiting trained manpower and deriving the benefit from other firms' training efforts.

EXPERIENCE ON-THE-JOB AND FORMAL TRAINING AS ALTERNATIVE MEANS OF SKILL ACQUISITION: AN EMPIRICAL STUDY. Maton, J. In International Labour Review; v100 n3, p. 239-255. Sep. 1969.

On the results of a survey carried out among ten undertakings in Belgium and six in Argentina with a sample of 200 to 300 skilled workers, middle-level technicians and assistant engineers, a comparative study was made of the time requirements for various combinations of training – formal training and on-the-job experience. The primary school graduate has the choice between zero and six years of technical secondary education. Each additional year of such training will exempt him from a period of experience on the job. In this way, the possible combinations necessary to become a tool and die-maker can be determined; these combinations can be represented by curves of possible choices. Using the results of the survey, scatter diagrams of the combinations were plotted for each category of worker. Using regression analysis, representative empirical curves and possible training combinations were determined. The analysis of these curves leads to a set of training equivalencies (in years) set out in tabular form. It was found that, if the costs and loss of practical experience while undergoing formal training are taken into account, it can be stated that in conditions favorable to skill diffusion, selected workers may become highly skilled through practical experience equally well as through formal training. The introduction of the senior cycle of secondary education shifts the training to the school and its financing to the government from industry.

TRAINING FOR RESULTS: A SYSTEMS APPROACH TO THE DEVELOPMENT OF HUMAN RESOURCES IN INDUSTRY. Warren, Malcolm W. 249 p. 1969. Available from Addison-Wesley Publishing Company, Inc., Reading, Massachusetts 01867.

Using the systems approach, this book explores training in industry as an organization tool for developing human resources, and stresses training results and return on investment rather than training programs as such. It is intended as a guide for general managers, personnel and industrial relations directors, and training directors on how training functions, how and when it is cost effective, how to evaluate it, and how it should be structured within the mass production, sales, supervisory, administrative, and technical

training fields. Included are sections on cost estimating and evaluating training in terms of objectives and results. Training systems elements (research, analysis, development, operations, evaluation) are also explained, together with such other aspects as instructional design, feedback, financial support for employee self-improvement, and the organization and staffing of the training function. An index, bibliography, and 19 tables and figures are also included.

CAN WE EVALUATE TRAINING EXPENDITURES? Barrett, James E. In Training in Business and Industry; v7 n1, p. 40-43. Jan. 1970.

Although accurate measurement of training effectiveness is expensive and time consuming, it is possible. Many formal measurements of training results and a few formal measurements of training value have been created.

PROFIT FROM TRAINING. Hennessy, David E. In Training in Business and Industry; v6 n2. Feb. 1969.

Training efforts in business corporations often never emerge from the concept stage because of the failure of training directors to speak the language of upper management: dollars and cents. A method of analyzing and presenting such training in terms of increasing corporate analyzing and presenting such training in terms of increasing corporate profits by reducing personnel deficiencies is elucidated and involves the following steps: (1) determine where personnel deficiencies exist which are contributing to cash outflow and how much money could be saved if the deficiencies were 100% eliminated; (2) determine the training program effectiveness in terms of percentage of such and dollar equivalent, and the allowable training program cost; (3) determine the actual training program development cost and the expected effectiveness level; (4) prepare a cash-flow sheet and diagram before making the budget program; (5) after project approval, develop and evaluate pilot programs in the field before proceeding to implement a full scale program.

ACCOUNTING FOR PERSONNEL TRAINING AND DEVELOPMENT COSTS. Douthout, John. In Training and Development Journal; v24 n6, p. 2-6. June 1970.

Conventional accounting practices tend to penalize managers who invest in human resource development. Five tables and figures. Four references.

TEACHING FUTURE SALES MANAGERS HOW TO MANAGE: A METHOD FOR TEACHING SALES ORGANIZING, PLANNING, AND CONTROLLING. Dies, Robert P. In Training and Development Journal; v23 n1, p. 24-6. Jan. 1969.

Educational techniques were developed to help line executives train first-line supervisors in modern sales management theory and practice. A first attempt at critique and feedback resulted in the need for planning a more basic program: theory, concept clarification, practical application, and evaluation. Training specialists conducted group sessions on theory and presented a team test of sales management. Regional managers led the following session on test correction and practical application of concepts. During the interval between training sessions the men applied learnings to their own work and prepared presentations of their results. The next training session revealed excellent analysis of zones sales results, confident and enthusiastic trainees, and development of individual sales planning, organizing and controlling programs.

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